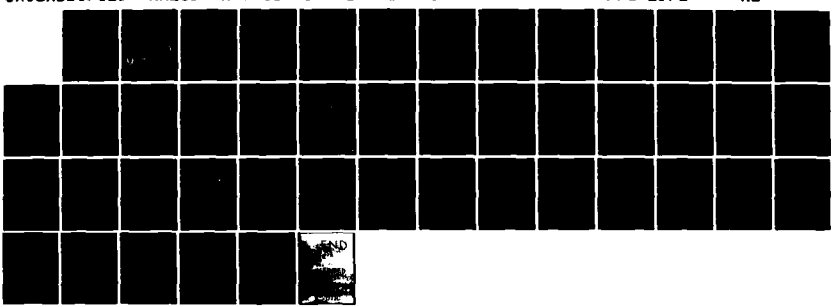
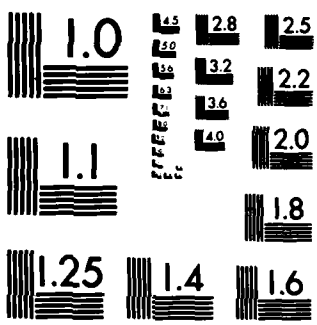
AD-A145 030 GEMSS (GROUND EMPLACED MINE SCATTERING SYSTEM) EXTENDED 1/1
RANGE TRIPLINE SE..(U) HONEYWELL INC MINNEAPOLIS MN
DEFENSE SYSTEMS DIV M B WEIDENBACH ET AL. JUL 84 47127
UNCLASSIFIED ARLCD-CR-84020 DAAK10-83-C-0049 F/G 19/1 NL





12





CONTRACTOR REPORT ARLCD-CR-84020

# GEMSS EXTENDED RANGE TRIPLINE SENSOR (ERTS) PRODUCT IMPROVEMENT PROGRAM (PIP)

M.B. WEIDENBACH
B.J. AMUNDSON
R.A. JOHNSON

HONEYWELL INC.
DEFENSE SYSTEMS DIVISION
5640 SMETANA DRIVE
MINNETONKA, MN 55343



JULY 1984

U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT CENTER
LARGE CALIBER WEAPON SYSTEMS LABORATORY
DOVER, NEW JERSEY

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (WHEN DATA ENTERED)

| REPORT DOCUMENTATION PAGE | | READ INSTRUCTIONS BEFORE COMPLETING FORM |
|---|---|---|
| 1. REPORT NUMBER<br>Contractor Report ARLCD-CR-84020 | 2. GOV'T ACCESSION NUMBER<br>ADA145030 | 3. RECIPIENT'S CATALOG NUMBER |
| 4. TITLE (AND SUBTITLE)<br>GEMSS EXTENDED RANGE TRIPLINE SENSOR (ERTS) PRODUCT IMPROVEMENT PROGRAM (PIP) | | 5. TYPE OF REPORT/PERIOD COVERED<br>Final<br>2 March 1983 -- 30 December 1983 |
| | | 6. PERFORMING ORG. REPORT NUMBER<br>47127 |
| 7. AUTHOR(S)<br>M. B. Weidenbach<br>B. J. Amundson<br>R. A. Johnson | | 8. CONTRACT OR GRANT NUMBER(S)<br>DAAK10-83-C-0049 |
| 9. PERFORMING ORGANIZATIONS NAME/ADDRESS<br>Honeywell Inc. -- Defense Systems Division<br>5640 Smetana Drive<br>Minnetonka, MN 55343 | | 10. PROGRAM ELEMENT,PROJECT,TASK AREA & WORK UNIT NUMBERS<br>PIP No. 1-82-09-7721 |
| 11. CONTROLLING OFFICE NAME/ADDRESS<br>ARDC, TSD<br>STINFO Div [DRSMC-TSS(D)]<br>Dover, NJ 07801 | | 12. REPORT DATE<br>July 1984 |
| | | 13. NUMBER OF PAGES<br>44 |
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| | | 15a. DECLASSIFICATION DOWNGRADING SCHEDULE |

16. DISTRIBUTION STATEMENT (OF THIS REPORT)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (OF THE ABSTRACT ENTERED IN BLOCK 20, IF DIFFERENT FROM REPORT)

18. SUPPLEMENTARY NOTES

19. KEY WORDS ( CONTINUE ON REVERSE SIDE IF NECESSARY AND IDENTIFY BY BLOCK NUMBER)

Extended range tripline sensor
Ground emplaced mine scattering system
First article acceptance test
Lot acceptance test
Product improvement program

20. ABSTRACT (CONTINUE ON REVERSE SIDE IF NECESSARY AND IDENTIFY BY BLOCK NUMBER)

Three changes were incorporated into the GEMSS extended range tripline sensor (ERTS): (1) a stronger tripline, (2) a smaller breakwire, and (3) B. F. Goodrich Estane 58880 as the diaphragm material. A final successful first article acceptance test was run, as well as a successful lot acceptance test for the single delivery lot of 4,500 ERTS units.

HD-168 REV 11/74

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 55 IS OBSOLETE

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SECURITY CLASSIFICATION OF THIS PAGE (WHEN DATA ENTERED)

# Contents

# INTRODUCTION

The extended range tripline sensor is used in the antipersonnel mines of the GEMSS, GATOR and MOPMS systems. The tripline is deployed when the bobbin on which it is wound is spring ejected from the sensor body. The bobbin is mechanically locked to the sensor body by a release mechanism which is designed to be activated by gas pressure above a threshold level. Activation of the release mechanism unlocks the bobbin. A pressure cartridge is used to supply the required threshold level of gas pressure. The deployed tripline is the mine's detection element; however, the sensitivity of this detection is dependent on how well the force of target/tripline interaction is transmitted through the tripline to a 0.0040-inch breakwire and the force needed to break this wire. The mine's electronic assembly monitors the continuity of this wire and initiates the self-destruct mode when wire continuity is lost.

In the subzero climate environments of the GEMSS DTII and OTII tests, the deployment of tripline from sensor was adequate but not 100 percent. Analysis of the hardware and data identified the reasons for this non-deployment as: the rigidity of the sensor's diaphragm and/or the lower output of the pressure cartridge at cold temperatures. The current material used for the diaphragm is Roylar E-82 and its flexibility is highly temperature dependent at cold temperatures; for example, its flexibility at the system's required low temperature operating limit of $-35°F$ is approximately 52 percent of its flexibility at $0°F$. Also, pressure cartridge closed bomb tests indicate that the average peak pressure at $-35°F$ is approximately 65 percent of the average peak pressure at the system's high temperature operating limit of $125°F$. The need for replacement is urgent because Roylar E-82 is no longer manufactured. It will be replaced by Estane 58880.

The detection sensitivity of the tripline/breakwire interface meets the requirements of the sensor specification; however, tactical field test data indicated that the strength of the tripline should be increased and that of the breakwire decreased. In the ideal detection situation, the minimum (1.8 lb) break strength of the tripline and the maximum (0.9 lb) break strength of the breakwire guarantee a detection if the tension force in the tripline exceeds 0.9 lb. In the tactical situation, it is often the case that between the source of the tension in the tripline and the breakwire, the tripline is in contact with other objects (vegetation, etc.). This means that the tension in the tripline at the source may exceed the minimum 1.8 lb needed to break the tripline before the tension force at the breakwire is sufficient to break the breakwire. An ideal tripline would be one that could not be broken. Another tactical situation that sometimes occurs is that the target detects the tension in

the tripline before it induces a tension of 0.9 lb, the maximum breakwire strength. Detection sensitivity for this last case would be improved if the breakwire had a maximum break strength less than the current 0.9 lb.

One of the principal objectives of this product improvement program was to incorporate the following changes into the extended range tripline (ERTS) technical data package and to demonstrate/characterize each for adequacy:

a. Alternate diaphragm material which is more flexible at cold temperature. (Original material in TDP is also no longer available.)

b. Weaker breakwire for increased sensitivity.

c. Stronger tripline thread to increase probability of breakwire opening before tripline breaks when pulled.

A second objective was to manufacture and deliver 4,500 ERTS with above modifications to Aerojet Corp., who had a parallel PIP contract to include improved sensors plus other modifications in the M74 mine.

The third objective was to provide a quantity of lithium cells to both Aerojet Corp. and Burroughs Corp. as government furnished material (GFM) to be used on PIP contracts for the M74 and M75 mines, respectively. The lithium cell is the power source for the GEMSS M74 and M75 mines and will be required in many of the mines manufactured under the GEMSS PIP program. The technical data package (TDP) for the lithium cell is a proven TDP; therefore, with respect to the lithium cell, Contract DAAK10-83-C-0049 was simply the vehicle to procure lithium cells and deliver them as GFM to the appropriate PIP contractors.

# TECHNICAL REPORT

The principal objectives of this contract were to incorporate three changes into the Extended Range Tripline Sensor (ERTS), to test the effectiveness of these changes, and to ship 4500 ERTS to a specified contractor. An additional objective was to ship 2250 standard lithium batteries to the same contractor.

## Changes Incorporated

The three changes incorporated into the ERTS in this contract were:

1. A stronger tripline (2.5 lb minimum break strength versus the original 1.8 lb minimum break strength).

2. A smaller breakwire (0.0035-inch diameter versus the original 0.0040 inch diameter).

3. A different diaphragm material (B.F. Goodrich Estane 58880 versus the original Uniroyal E-82).

## Data Review

The initial effort on this contract consisted of a review of the technical data (drawings and specification) to determine changes necessary to make them compatible with the three changes specified above. Results of this review were submitted in a letter from J.H. Lundquist, dated 13 April 1983, Subject: Contract DAAK10-83-C-0049, GEMSS ERTS PIP, CRDL Requirements.

### Drawing Changes

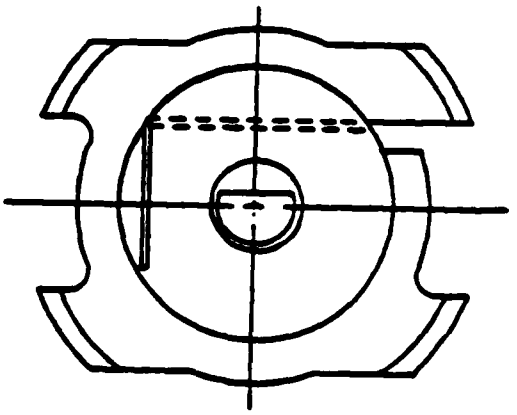
The drawing changes necessary to reflect the three changes and to correct minor errors are presented in Table 1.

All NEXT ASSEMBLY and USED ON boxes should be changed as necessary to assure that the drawings are identified with the proper mine.

Table 1. Drawing change summary

| Drawing | Change required | Comments |
|---|---|---|
| 9298576 (Wire, Magnet, Electrical) | In Note 1B, "#38 AWG" should be "#39 AWG". In Note 1C, "0.004 ± 0.0001 ROUND" should be "0.0035 ± 0.0001 ROUND". | This is an ADAM drawing. If this change is made the drawing cannot be used for ADAM. The drawing can either be changed to a tabulated drawing or a new drawing can be made. |
| 9292972 (Tripline Sensor Extended Range) | In Note 3, "LOCATED 32 FEET" should be "LOCATED 29 FEET" and "0.3 TO 0.9 LB" should be "0.22 TO 0.82 LB". | See paragraphs entitled "Deployment Barrier Distance" and "New Minimum and Maximum Limits on Breakwire Strength" on pages 8 and 9, respectively. |
| 9292991 (Release Mechanism Assembly) | In Zone C5 change "RING, LOCK - 9298586" to "RING, BALL LOCK - 9298586". | |
| 9292998 (Diaphragm Assembly) | In Zone CD-3 change "DIAPHRAGM - 9298598-2" to "DIAPHRAGM - 9298598-1". | |
| 9298592 (Thread, Polyester) | In Note 1A, "234 ± 8 DECITEX" should be "320 ± 8 DECITEX". In Note 1B, "1.8 LB MIN" should be "2.5 LB MIN". | This is an ADAM drawing. If this change is made it cannot be used for ADAM. The drawing can either be changed to a tabulated drawing or a new drawing can be made. |
| 9298598 (Diaphragm) | In the table at the bottom of the drawing add "9292998" in the NEXT ASSEMBLY box for 9298598-1. | |
| 9292982 (Bobbin Assembly) | In Note 2, "46 ± 3 FEET" should be "34 ± 2 FEET". In Note 7, "750 REVOLUTIONS" should be "580 REVOLUTIONS".<br>Delete Note 8.<br>Change left view as shown in Figure 1.<br>Add Note 10: "ADD A DROP OF ADHESIVE AT EXIT POINT OF THREAD JUST PRIOR TO ASSEMBLY OF THE BOBBIN WEIGHT INTO THE BOBBIN". | Permission to incorporate this change was granted by ARRADCOM approval of Deviation 0297-008 (Ref PAN A3N7705). |
| XXXXXXX (Adhesive) | Make a new drawing like Figure 2 for the adhesive. | |

FROM:



TO:

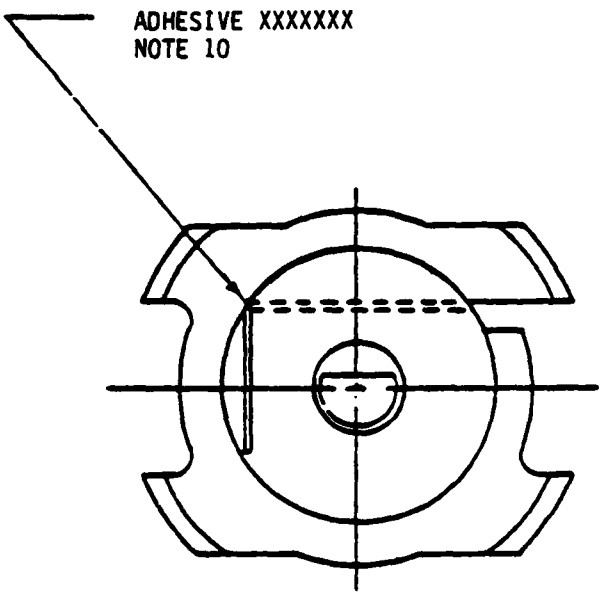



Figure 1. Changes to end view on drawing 9292982

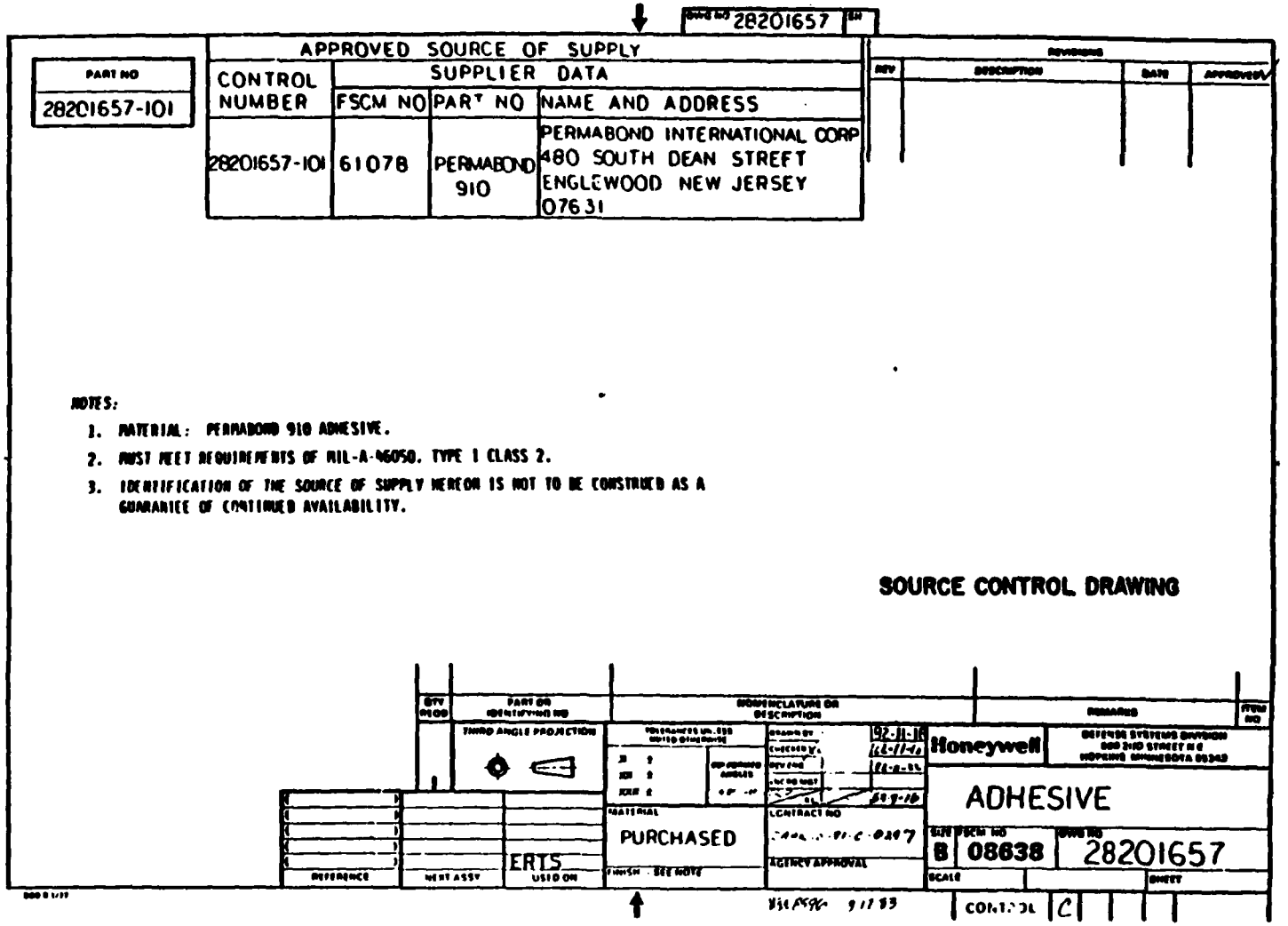



Figure 2. Adhesive drawing

During this contract it was apparent that vendors were having difficulty manufacturing the booster spring (9292990). The drawing had ambiguities in it as evidenced by various interpretations of what it meant. In addition, it was obvious that the spring load test fixture was not conducive to providing repeatable load readings. In order to clear up the ambiguities and improve the load test fixture, ECP 83-0007-045 was submitted. It was submitted on ERTS GATOR Contract DAAK10-83-C-0007 running concurrently with the ERTS GEMSS PIP contract which this report covers; however, the changes requested in it apply to the GEMSS PIP sensor because the same booster spring is used in both sensors. The ECP requested the following changes to drawing 9292990:

a. In Zone C4 change "0.395 + 0.010 SEE NOTE 8" to "0.395 + 0.010 SEE NOTES 8 & 9."
b. In Zone C4 add "SEE NOTE B" with an arrow pointing to the left end of the spring.
c. In Zone C3 change "SEE NOTE 5" to "SEE NOTE B."
d. In Zone C2 change "0.385 + 0.010" to "0.385 MIN."
e. In Zone D2 change "0.455 MAX DIA, 8 COILS REF SEE NOTE 9" to "0.455 MAX DIA, 9 COILS REF SEE NOTE 9."
f. In Zone D2 make the extension lines defining the 0.455 MAX DIA refer to the OD of the 9 smaller coils rather than to the OD of the 2 larger coils.
g. In Note 7 change 0.475 to 0.484 and change 0.340 to 0.384.

The ECP was approved with modifications and the final changes are described in NOR A3N5166. The drawing should be changed per this NOR.

#### Specification Changes

The changes to Specification MIL-S-48755 (AR) necessary to reflect the three changes and to correct minor errors are:

a. Delete paragraphs 3.3 and 4.5.1.1 and all further references to these paragraphs.
b. In paragraph 3.5 change "thirty-two (32) feet" to "twenty-nine (29) feet."
c. In paragraph 3.6 change "140 grams (0.3 pound) min and 410 grams (0.9 pound) max" to "100 grams (0.22 pound) min and 370 grams (0.82 pound) max."
d. In paragraph 3.11.a change "Assemble" to "Assembly."
e. In paragraph 3.11.f change "Ball Lock Ring" to "Ring, Ball Lock."
f. In paragraph 4.4.2.22 Major 104 change "140 grams (0.3 pound) to 410 grams (0.9 pound)" to "100 grams (0.22 pound) to 370 grams (0.82 pound)." Delete Major 101 and Note 2.

g. In paragraph 4.5.1.3.a change "32 feet" to "29 feet."
h. In paragraphs 6.1.a, 6.1.b, and 6.1.c revise to reflect whatever mines use the smaller breakwire, stronger thread and different diaphragm material.

### Bobbin Analysis

An analysis of the bobbin assembly was made to determine the amount of stronger thread that can be wound on the bobbin, and to determine the effect of this stronger thread on deployment barrier distance and bobbin assembly CG location. Results of this analysis were submitted to ARRADCOM in a letter from J.H. Lundquist dated 11 May 1983, Subject: Contract DAAK10-83-C-0049, GEMSS ERTS PIP CRDL Requirements.

#### Thread Length

The stronger thread used on this contract has a larger diameter than the standard thread. Thus, when the standard length (46 $\pm$ 3 feet) of the stronger thread is wound on the Bobbin (9292985), the diameter over the wound thread is significantly larger than when the standard thread is used. This results in interference between the thread and the inside of the Sleeve (9292988), causing assembly difficulties when assembling the Bobbin Assembly (9292982) into the Sleeve. Cut and nicked thread and friction between the thread and Sleeve ID results.

In order to eliminate these problems, less of the stronger thread must be wound on the bobbin. It has been experimentally determined that a maximum of 36 feet of the stronger thread should be used to provide proper assembly and release and to maintain thread integrity. Using a realistic overall length tolerance of $\pm$ 2 feet results in the recommended thread length of 34 $\pm$ 2 feet for the stronger thread.

#### Deployment Barrier Distance

Because the stronger thread is thicker, less thread can be wound on the bobbin, making the deployment distance less. Deployment test (OEXM 31388) shows that at the standard barrier deployment distance of 32 feet the barrier could not be cleared consistently. When the barrier distance was moved closer at 29 feet, the barrier was cleared consistently. In additional deployment tests on 36 sensors, all cleared the barrier at 29 feet. The three-foot reduction in barrier distance is strictly a function of thread length and has nothing to do with the weight and CG characteristics of the bobbin. The bobbin wound with the stronger thread clears the barrier located at 29 feet just as well as the bobbin wound with the standard thread clears the barrier located at 32 feet.

### Center of Gravity

The bobbin analysis shows that the CG shift of the bobbin assembly wound with the stronger thread is 0.002 inch. This is insignificant with respect to sensor deployment characteristics. The weight of the bobbin assembly wound with the stronger thread is 0.0218 gram more than that of the bobbin assembly wound with the standard thread. This weight increase can be eliminated by removing material from the bobbin weight, either by making it shorter or by increasing the diameter of the hole in it. Since the heavier bobbin assembly clears the barrier located at 29 feet just as well as the standard bobbin assembly clears the barrier located at 32 feet, a change to lighten it is unnecessary and is not recommended.

### New Minimum and Maximum Limits on Breakwire Strength

The new minimum and maximum breakwire break strength limits were established from the data on 182 ERTS sensors tested on the GATOR PIP program (Contract DAAK10-82-M-0504) and reported in test report OEXM 31388. The former limits of 140 grams minimum and 410 grams maximum resulted in a spread of 270 grams. Based on statistical analysis of the data and past experience on the ADAM program, it is felt that this spread should be maintained. This is also the basis for selecting the new limits of 100 grams (0.22 lb) minimum and 370 grams (0.82 lb) maximum.

# QUALITY REPORT

Quality tests conducted for the GEMSS PIP contract were the standard tests: (1) First Article Acceptance Test (FAAT) and, (2) Lot Acceptance Test (LAT). A total of four tests were actually run, consisting of two unsuccessful FAATs, a final successful FAAT, and a single successful LAT for the single delivery lot containing a quantity of 4,500 units. See Appendix A for attachments dealing with quality tests. Attachment 1 is the conditional approval of the FAAT, Attachment 2 is the raw data sheet for this FAAT, Attachments 3 and 4 are the raw data sheets for the first two FAATs and Attachment 5 is the raw data sheet for the LAT.

### First Article Acceptance Tests

The first FAAT occurred on 27 July 1983. Failures to release the bobbin (three units) were traced to a machine assembly problem that was damaging the diaphragm. Appropriate corrective action was taken, which eliminated this problem. All existing hardware was scrapped and a new set of units was built.

The second FAAT on 30 August 1983 was unsuccessful due mainly to test errors as well as sample preparation problems. Improper calibration of the pressure system, used in conjunction with the test equipment during cold temperature testing, caused an overpressurization of the diaphragm assembly. When combined with inadequate sealing, it caused separation from the sensor case, resulting in release failures. Appropriate corrective action was taken and a third FAAT was scheduled.

The successful FAAT of 20 September 1983 had the following results:

- One of 82 units experienced post pullout below the 540-gram requirement (recorded for information only)
- One of 82 units failed breakwire force
- One of 32 units failed cold release (see Attachment 2 for test data).

The breakwire and release failures were caused by potting material intrusion under the post cover during sample preparation. The sample's post covers had not been sealed with epoxy prior to potting. This type of defect would not normally occur on shipped units since all sensors would be properly sealed with epoxy prior to shipment. These units were classed as "no tests" and spares were functioned in their place. All subsequent testing has been performed with epoxy sealed sensors.

Following this FAAT, a conditional approval was given by ARDC (see Appendix A). Honeywell's action for achieving full Governmental approval for the first article test was to ensure that all future LATs would be conducted using sample units sealed with epoxy before potting. The production layout was changed to formalize this action. The corrective action was completed and locally approved by DCAS on 14 October 1983.

**Lot Acceptance Test**

The LAT was conducted on 16 November 1983. The results of this test were as follows:

- One of 80 units failed breakwire force
- Three of 80 units failed post retention and thread strength (see Attachment 5 for test data).

Analysis of the breakwire failure showed that the breakwire retaining ring was not assembled properly, allowing the post to be pulled out of the sensor without breaking the breakwire. Thus, this unit was also counted in the second category as well, for a total of three defective units (not four). No cause was discerned for the other two units that experienced thread breakage below the 540-gram minimum. No corrective action for the above defects has been taken since additional quantities are not being built. The lot was accepted as tested since the defects identified were below allowable defects per the sample plan and AQL's specified.

# SPECIAL TESTS

## Leakage Test

The leakage test was conducted to determine: (1) the leak rate through undeployed sensors at a sensor pressurization of 75 ± 5 psi, and (2) the leak rate through deployed sensors at their deployment pressure or, if the sensors did not deploy before being pressurized to 300 ± 10 psi, their leak rate at 300 ± 10 psi. All tests were conducted at ambient temperature (75° ± 10°F) and nitrogen gas was used as the pressure medium. Results are contained in test report OEXM 32211 (Appendix B). This test report was also submitted with a letter from J.H. Lundquist dated 6 January 1984, Subject: Contract DAAK10-83-C-0049 GEMSS ERTS PIP Test Report, Langlie Test.

## Langlie Test

The Langlie test was conducted to determine sensor tripline deployment at three different square pressure pulse time durations at various pulse pressure levels. Results are also contained in test report OEXM 32211 (Appendix B).

# APPENDIX A
# FIRST ARTICLE TEST SUMMARY REPORT AND LOT ACCEPTANCE TEST RESULTS

# ATTACHMENT 1

1. First Article Test Summary Report

US Army Armament Research and
Development Center
Dover, NJ 07801

2. Date

3. Report No.
463-33

4. In reply refer to
DRSMC-QAM-VF(D)/92

5. Preliminary ☐
Supplemental ☐
Final ☒

6. To
Commander
DCASPRO Honeywell
2701 Fourth Ave.
So. Honeywell Plaza
Minneapolis, MN 55408

7. Date initial production sample received
at New Brighton, MN
(insert location)
Date 20 Sept. 1983

8. Contract No.
DAAK10-83-C-0049

9. Contractor
Honeywell, Inc.

10. Complete sample ☒
Partial sample ☐
3rd Submission

11. Item nomenclature
Sensor Tripline, Extended Range.

12. Quantity
As per Contract

13. Inspection in accordance with
MIL-S-48755(AR) w/Amend. 5 dtd 5 May 82.

14. Name(s)

15. Representing

16. Inspected by
R. Flanagan

17. Submitted by
A. Siegfried/afb/201-724-2458

18.

☐ The contractor may proceed with production.

☒ The contractor may proceed with production provided the deviations cited under Remark of block 28 are corrected.

☐ Corrective action cited on block 28 is required

☒ Conditionally Approved.

19. Distribution
C/ Turn: Honeywell, Inc.

| | |
|---|---|
| R. Currie | MN92-3553 |
| B. Amundson | MN29-3681 |
| F. Rehwaldt | MN29-3681 |
| M. Weidenbach | MN29-3680 |
| J. Lundquist | MN04-1200 |
| C. Files | MN04-1280 |
| E. Ludke | MN29-3561 |

20. RICHARD W. PORTER
C, Mines & Sel Arm Br
TISD, PAD

____ CONCURS

Signed: Gael C. Baker
GAEL C. BAKER
ActC, Product Verification Branch

W. F. BELET
Contracting Officer

AEADCOM FORM 51 JUN 78 replaces SMU 1031-R AUG 66 which is obsolete

SHEET 1 OF 3

| 21. Item/Part Nomenclature | 22. Part No. | 23. Serial No. | 24. Specification No. | 25. Specification Paragraph No. | 26. Identification | 27. Test | |
|---|---|---|---|---|---|---|---|
| | | | | | | Pass | Fail |
| Tripline, Sensor Extended Range 82 each | 9292972 8-19-82 | N/A | MIL-S-48755(AR) w/Amend. 5 dtd 5 May 82 | 4.5.1.2.1 | Release of Sensor Assy. at Ambient Temperature | X | |
| | | | | 4.5.1.2.2 | Release of Sensor Assy. at Cold Temperature | | X |
| | | | | 4.5.13 | Tripline Deployment | X | |
| | | | | 4.5.1.4 | Breakwire Function Post | | X |
| | | | | 4.5.1.5 | Retention & Thread Breaking Strength | | X |
| | | | | 4.4.2.22 | Examination | X | |

ARRADCOM FORM 51a JUN 78 replaces SMU 1031-R AUG 66 which is obsolete

SHEET 2 OF 3

28. Summary of failures encountered and required corrective action.

Tripline Sensor, Extended Range, Dwg. 9292972 -

1. One unit failed to release at cold temperature. Major Defect

2. One unit failed breakwire functioning at cold temperature. Breakwire broke at 800 grams in lieu of 100 to 378 grams. Major Defect

3. One unit failed post retention at cold temperature. Post released at 280 grams, min. requirement is 540 grams. Test performed for informational purposes only.

ACTION TO BE TAKEN:

The contractor may proceed with production provided the defects noted above in paragraphs 1 and 2 are corrected to the satisfaction of the QAR.

ARRADCOM FORM 51b JUN 78 replaces SMJ 1031-R AUG 61 which is obsolete

SHEET 3 OF 3

# ATTACHMENT 2

ERTS
SENSOR ASSEMBLY
9292972
LAT RESULTS SUMMARY

DATE 9-20-83
LOT # P1P (GEMS)
LOT SIZE ____

| | | |
|---|---|---|
| B. AMUNDSON | MN29-3681 | |
| G. HANSON | MN29-3680 | |
| R. JOHNSON | MN29-3680 | |
| W. McCABE | MN29-3380 | |
| J. SHEEHAN | MN29-3690 | |
| D. STACHOWSKI | MN29-3680 | |

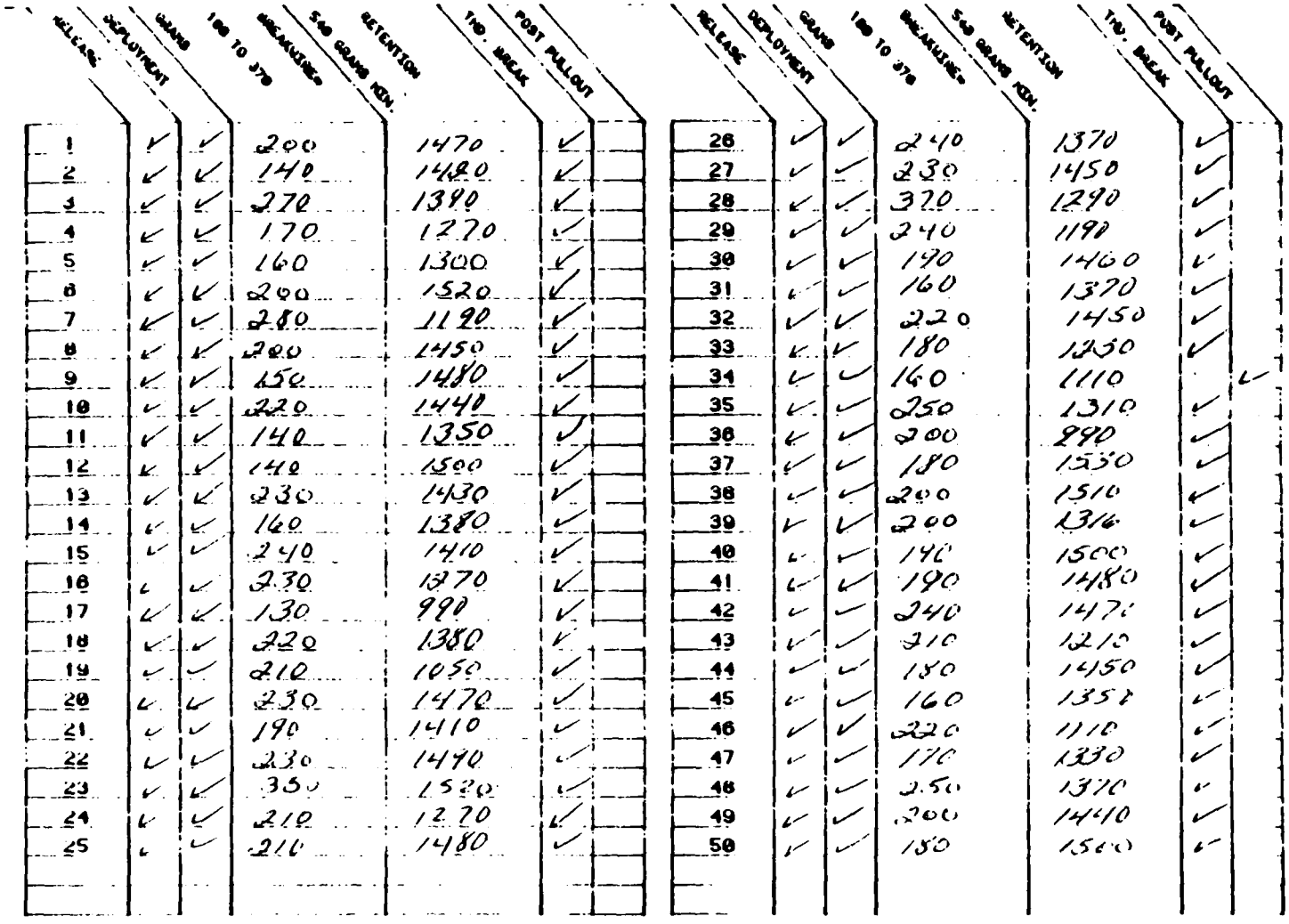
MIL-S-48755 PARA. 4.4.2.22

| | RESULTS | | REQUIREMENT | | REMARKS |
|---|---|---|---|---|---|
| | | | | | BLU-82/B ONLY |
| 102 AMBIENT RELEASE | 50/0 | | 50 | | |
| 102 COLD RELEASE | 32/0 * | | 32 | | |
| 103 AMBIENT DEPLOYMENT | 50/0 | | 50 | | |
| 103 COLD DEPLOYMENT | 32/0 | | 32 | | |
| 104 BREAKWIRE | 82/0 ** | | 82 | | |
| 105 POST RETENTION AND THREAD STRENGTH | 82/1 | | 82 | | INFORMATION ONLY |

NOTES :

** #1 & cold BW failure due to pulling mail under fisheye

* #29 cold FTR Due To pulling mail in unit because fisheye missing



| | RELEASE | DEPLOYMENT | GRAMS | 100 TO 370 | BREAKAGE* | 540 GRAMS MIN. | RETENTION | TWO - BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ✓ | ✓ | ✓ | 200 | | | 1470 | | ✓ |
| 2 | ✓ | ✓ | ✓ | 140 | | | 1480 | | ✓ |
| 3 | ✓ | ✓ | ✓ | 270 | | | 1390 | | ✓ |
| 4 | ✓ | ✓ | ✓ | 170 | | | 1270 | | ✓ |
| 5 | ✓ | ✓ | ✓ | 160 | | | 1300 | | ✓ |
| 6 | ✓ | ✓ | ✓ | 200 | | | 1520 | | ✓ |
| 7 | ✓ | ✓ | ✓ | 280 | | | 1190 | | ✓ |
| 8 | ✓ | ✓ | ✓ | 200 | | | 1450 | | ✓ |
| 9 | ✓ | ✓ | ✓ | 150 | | | 1480 | | ✓ |
| 10 | ✓ | ✓ | ✓ | 220 | | | 1440 | | ✓ |
| 11 | ✓ | ✓ | ✓ | 140 | | | 1350 | | ✓ |
| 12 | ✓ | ✓ | ✓ | 140 | | | 1500 | | ✓ |
| 13 | ✓ | ✓ | ✓ | 230 | | | 1430 | | ✓ |
| 14 | ✓ | ✓ | ✓ | 160 | | | 1380 | | ✓ |
| 15 | ✓ | ✓ | ✓ | 240 | | | 1410 | | ✓ |
| 16 | ✓ | ✓ | ✓ | 230 | | | 1370 | | ✓ |
| 17 | ✓ | ✓ | ✓ | 130 | | | 990 | | ✓ |
| 18 | ✓ | ✓ | ✓ | 220 | | | 1380 | | ✓ |
| 19 | ✓ | ✓ | ✓ | 210 | | | 1050 | | ✓ |
| 20 | ✓ | ✓ | ✓ | 230 | | | 1470 | | ✓ |
| 21 | ✓ | ✓ | ✓ | 190 | | | 1410 | | ✓ |
| 22 | ✓ | ✓ | ✓ | 230 | | | 1470 | | ✓ |
| 23 | ✓ | ✓ | ✓ | 350 | | | 1520 | | ✓ |
| 24 | ✓ | ✓ | ✓ | 210 | | | 1270 | | ✓ |
| 25 | ✓ | ✓ | ✓ | 210 | | | 1480 | | ✓ |

| | RELEASE | DEPLOYMENT | GRAMS | 100 TO 370 | BREAKAGE* | 540 GRAMS MIN. | RETENTION | TWO - BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|---|---|
| 26 | ✓ | ✓ | ✓ | 240 | | | 1370 | | ✓ |
| 27 | ✓ | ✓ | ✓ | 230 | | | 1450 | | ✓ |
| 28 | ✓ | ✓ | ✓ | 370 | | | 1290 | | ✓ |
| 29 | ✓ | ✓ | ✓ | 240 | | | 1190 | | ✓ |
| 30 | ✓ | ✓ | ✓ | 190 | | | 1460 | | ✓ |
| 31 | ✓ | ✓ | ✓ | 160 | | | 1370 | | ✓ |
| 32 | ✓ | ✓ | ✓ | 220 | | | 1450 | | ✓ |
| 33 | ✓ | ✓ | ✓ | 180 | | | 1250 | | ✓ |
| 34 | ✓ | ✓ | ✓ | 160 | | | 1110 | | ✓ |
| 35 | ✓ | ✓ | ✓ | 250 | | | 1310 | | ✓ |
| 36 | ✓ | ✓ | ✓ | 200 | | | 890 | | ✓ |
| 37 | ✓ | ✓ | ✓ | 180 | | | 1530 | | ✓ |
| 38 | ✓ | ✓ | ✓ | 200 | | | 1510 | | ✓ |
| 39 | ✓ | ✓ | ✓ | 200 | | | 1316 | | ✓ |
| 40 | ✓ | ✓ | ✓ | 140 | | | 1500 | | ✓ |
| 41 | ✓ | ✓ | ✓ | 190 | | | 1480 | | ✓ |
| 42 | ✓ | ✓ | ✓ | 240 | | | 1470 | | ✓ |
| 43 | ✓ | ✓ | ✓ | 210 | | | 1210 | | ✓ |
| 44 | ✓ | ✓ | ✓ | 180 | | | 1450 | | ✓ |
| 45 | ✓ | ✓ | ✓ | 160 | | | 1350 | | ✓ |
| 46 | ✓ | ✓ | ✓ | 220 | | | 1110 | | ✓ |
| 47 | ✓ | ✓ | ✓ | 170 | | | 1330 | | ✓ |
| 48 | ✓ | ✓ | ✓ | 250 | | | 1370 | | ✓ |
| 49 | ✓ | ✓ | ✓ | 200 | | | 1410 | | ✓ |
| 50 | ✓ | ✓ | ✓ | 180 | | | 1500 | | ✓ |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

| | RELEASE | DEPLOYMENT | GRAMS | 180 TO 370 BREAKSTRENGTH* | 540 GRAMS MIN. RETENTION | TWD. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|
| 1 | ✓ | ✓ | 260 | 1520 | | ✓ | |
| 2 | ✓ | ✓ | 280 | 1270 | | ✓ | |
| 3 | ✓ | ✓ | 260 | 1480 | | ✓ | |
| 4 | ✓ | ✓ | 220 | 1070 | | ✓ | |
| 5 | ✓ | ✓ | 260 | 1090 | | | ✓ |
| 6 | ✓ | ✓ | 220 | 1380 | | ✓ | |
| 7 | ✓ | ✓ | 210 | 1290 | | ✓ | |
| 8 | ✓ | ✓ | 230 | 1350 | | ✓ | |
| 9 | ✓ | ✓ | 280 | 280 | | | ✓ |
| 10 | ✓ | ✓ | 280 | 1440 | | ✓ | |
| 11 | ✓ | ✓ | 240 | 1020 | | ✓ | |
| 12 | ✓ | ✓ | 220 | 1490 | | ✓ | |
| 13 | ✓ | ✓ | 280 | 1470 | | ✓ | |
| 14 | ✓ | ✓ | 220 | 780 | | ✓ | |
| 15 | ✓ | ✓ | 230 | 1390 | | ✓ | |
| 16 | ✓ | ✓ | 240 | 1340 | | ✓ | |
| 17 | ✓ | ✓ | 280 | 1320 | | ✓ | |
| (18) | ✓ | ✓ | 800 | 1300 | | ✓ | |
| 19 | ✓ | ✓ | 220 | 1100 | | ✓ | |
| 20 | ✓ | ✓ | 280 | 1460 | | ✓ | |
| 21 | ✓ | ✓ | 300 | 1380 | | ✓ | |
| 22 | ✓ | ✓ | 280 | 1530 | | ✓ | |
| 23 | ✓ | ✓ | 300 | 1280 | | ✓ | |
| 24 | ✓ | ✓ | 230 | 1480 | | ✓ | |
| 25 | ✓ | ✓ | 250 | 1400 | | ✓ | |
| 26 | ✓ | ✓ | 220 | 1360 | | ✓ | |
| 27 | ✓ | ✓ | 240 | 1420 | | ✓ | |
| 28 | ✓ | ✓ | 280 | 1440 | | ✓ | |
| (29) | FTR | | | | | | |
| 30 | ✓ | ✓ | 260 | 1400 | | ✓ | |
| 31 | ✓ | ✓ | 240 | 1480 | | ✓ | |
| 32 | ✓ | ✓ | 240 | 1370 | | ✓ | |
| | ✓ | ✓ | 290 | 1470 | | ✓ | |
| | ✓ | ✓ | 230 | 1460 | | ✓ | |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

# ATTACHMENT 3

ERTS
SENSOR ASSEMBLY
8282972
LAT RESULTS SUMMARY

DATE 7/27/83
LOT # card 3-1 FAAT
LOT SIZE

| | | |
|---|---|---|
| B. AMUNDSON | MN20-3681 | |
| G. HANSON | MN20-3680 | |
| R. JOHNSON | MN20-3680 | |
| W. McCABE | MN20-3300 | |
| J. SHEEHAN | MN20-3600 | |
| D. STACHOWSKI | MN20-3680 | |

Gemss ERTS PIP DAAK10-83-C-0049

MIL-S-48755 PARA. 4.4.2.22

| | RESULTS | | REQUIREMENT | | REMARKS |
|---|---|---|---|---|---|
| | | | | | |
| 102 AMBIENT RELEASE | 1/50 | | 50-1-2 | | |
| 102 COLD RELEASE | 2/32 | | 32-1-2 | | |
| 103 AMBIENT DEPLOYMENT | 1/50 | | 50-3-4 | | |
| 103 COLD DEPLOYMENT | 0/32 | | 32-2-3 | | |
| 104 BREAKWIRE | 0/82 | | 82-5-8 | | |
| 105 POST RETENTION AND THREAD STRENGTH | 0/82 | | 82 | | INFORMATION ONLY |

NOTES :

| | RELEASE | DISPLACEMENT | GRAMS | 150 TO 270 | BREAKAGE* | 544 GRAMS MIN. | RETENTION | TWO BREAK | POST PULLOUT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ✓ | ✓ | ✓ | 260 | | | 1250 | | ✓ | |
| 2 | ✓ | ✓ | ✓ | 240 | | | 1380 | | ✓ | |
| 3 | ✓ | ✓ | ✓ | 290 | | | 1300 | | ✓ | |
| 4 | ✓ | ✓ | ✓ | 220 | | | 1340 | | ✓ | |
| 5 | ✓ | ✓ | ✓ | 330 | | | 1330 | | ✓ | |
| 6 | ✓ | ✓ | ✓ | 260 | | | 1350 | | ✓ | |
| 7 | ✓ | 28.5 Short | | 280 | | | 1350 | | ✓ | |
| 8 | ✓ | ✓ | ✓ | 240 | | | 1450 | | ✓ | |
| 9 | ✓ | ✓ | ✓ | 250 | | | 960 | | ✓ | |
| 10 | ✓ | ✓ | ✓ | 260 | | | 1350 | | ✓ | |
| 11 | ✓ | ✓ | ✓ | 250 | | | 1230 | | ✓ | |
| 12 | ✓ | ✓ | ✓ | 240 | | | 1410 | | ✓ | |
| 13 | ✓ | ✓ | ✓ | 220 | | | 1280 | | ✓ | |
| 14 | ✓ | ✓ | ✓ | 210 | | | 1440 | | ✓ | |
| 15 | ✓ | ✓ | ✓ | 230 | | | 1440 | | ✓ | |
| 16 | ✓ | ✓ | ✓ | 220 | | | 1340 | | ✓ | |
| 17 | ✓ | ✓ | ✓ | 260 | | | 1320 | | ✓ | |
| 18 | ✓ | ✓ | ✓ | 230 | | | 1300 | | ✓ | |
| 19 | ✓ | ✓ | ✓ | 240 | | | 1380 | | ✓ | |
| 20 | ✓ | ✓ | ✓ | 190 | | | 1440 | | ✓ | |
| 21 | ✓ | ✓ | ✓ | 270 | | | 1280 | | ✓ | |
| 22 | ✓ | ✓ | ✓ | 250 | | | 1240 | | ✓ | |
| 23 | ✓ | ✓ | ✓ | 250 | | | 1410 | | ✓ | |
| 24 | ✓ | ✓ | ✓ | 260 | | | 1370 | | ✓ | |
| 25 | ✓ | ✓ | ✓ | 250 | | | 1370 | | ✓ | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| | RELEASE | DISPLACEMENT | GRAMS | 150 TO 270 | BREAKAGE* | 544 GRAMS MIN. | RETENTION | TWO BREAK | POST PULLOUT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 26 | PTK | | | | | | | | | |
| 27 | ✓ | ✓ | | 290 | | | 1340 | | ✓ | |
| 28 | ✓ | ✓ | | 270 | | | 1450 | | ✓ | |
| 29 | ✓ | ✓ | | 270 | | | 1290 | | ✓ | |
| 30 | ✓ | ✓ | | 230 | | | 1050 | | ✓ | |
| 31 | ✓ | ✓ | | 210 | | | 1300 | | ✓ | |
| 32 | ✓ | ✓ | | 270 | | | 1390 | | ✓ | |
| 33 | ✓ | ✓ | | 250 | | | 1400 | | ✓ | |
| 34 | ✓ | ✓ | | 220 | | | 1260 | | ✓ | |
| 35 | ✓ | ✓ | | 210 | | | 1430 | | ✓ | |
| 36 | ✓ | ✓ | | 230 | | | 1290 | | ✓ | |
| 37 | ✓ | ✓ | | 290 | | | 1390 | | ✓ | |
| 38 | ✓ | ✓ | | 230 | | | 1310 | | ✓ | |
| 39 | ✓ | ✓ | | 230 | | | 1370 | | ✓ | |
| 40 | ✓ | ✓ | | 260 | | | 1190 | | ✓ | |
| 41 | ✓ | ✓ | | 300 | | | 1230 | | ✓ | |
| 42 | ✓ | ✓ | | 290 | | | 980 | | | ✓ |
| 43 | ✓ | ✓ | | 270 | | | 1340 | | ✓ | |
| 44 | ✓ | ✓ | | 330 | | | 1310 | | ✓ | |
| 45 | ✓ | ✓ | | 260 | | | 1320 | | ✓ | |
| 46 | ✓ | ✓ | | 230 | | | 1090 | | ✓ | |
| 47 | ✓ | ✓ | | 270 | | | 1450 | | ✓ | |
| 48 | ✓ | ✓ | | 220 | | | 1490 | | ✓ | |
| 49 | ✓ | ✓ | | 240 | | | 1250 | | ✓ | |
| 50 | ✓ | ✓ | | 280 | | | 1300 | | ✓ | |
| 7 | ✓ | ✓ | | 260 | | | 1450 | | ✓ | |
| 26 | ✓ | ✓ | | 280 | | | 1450 | | ✓ | |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

| | RELEASE | DEPLOYMENT | BRAKE | 1 OF 3 TO 370 | BREAKAGE* | 540 GRAMS MIN. | RETENTION | TWD. BREAK | POST PULLOUT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | ✓ | ✓ | 290 | | | 1340 | | ✓ | |
| 2 | | FTR | | | | | | | | |
| 3 | | ✓ | ✓ | 280 | | | 1500 | | ✓ | |
| 4 | | ✓ | ✓ | 230 | | | 1450 | | ✓ | |
| 5 | | ✓ | ✓ | 370 | | | 1280 | | ✓ | |
| 6 | | ✓ | ✓ | 250 | | | 1090 | | ✓ | |
| 7 | | ✓ | ✓ | 260 | | | 1310 | | ✓ | |
| 8 | | ✓ | ✓ | 230 | | | 1390 | | ✓ | |
| 9 | | ✓ | ✓ | 230 | | | 1470 | | ✓ | |
| 10 | | ✓ | ✓ | 260 | | | 1470 | | ✓ | |
| 11 | | ✓ | ✓ | 230 | | | 1290 | | ✓ | |
| 12 | | ✓ | ✓ | 290 | | | 1230 | | ✓ | |
| 13 | | ✓ | ✓ | 240 | | | 1320 | | ✓ | |
| 14 | | ✓ | ✓ | 260 | | | 1300 | | ✓ | |
| 15 | | ✓ | ✓ | 220 | | | 1450 | | ✓ | |

| | RELEASE | DEPLOYMENT | BRAKE | 1 OF 3 TO 370 | BREAKAGE* | 540 GRAMS MIN. | RETENTION | TWD. BREAK | POST PULLOUT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | | ✓ | ✓ | 230 | | | 1460 | | ✓ | |
| 17 | | ✓ | ✓ | 290 | | | 1490 | | ✓ | |
| 18 | | ✓ | ✓ | 320 | | | 1430 | | ✓ | |
| 19 | | ✓ | ✓ | 280 | | | 1320 | | ✓ | |
| 20 | | ✓ | ✓ | 250 | | | 1230 | | ✓ | |
| 21 | | ✓ | ✓ | 220 | | | 1540 | | ✓ | |
| 22 | | ✓ | ✓ | 220 | | | 1430 | | ✓ | |
| 23 | | ✓ | ✓ | 230 | | | 1370 | | ✓ | |
| 24 | | ✓ | ✓ | 220 | | | 1360 | | ✓ | |
| 25 | | ✓ | ✓ | 190 | | | 1410 | | ✓ | |
| 26 | | ✓ | ✓ | 230 | | | 1380 | | ✓ | |
| 27 | | ✓ | ✓ | 250 | | | 840 | | ✓ | |
| 28 | | ✓ | ✓ | 190 | | | 1310 | | ✓ | |
| 29 | | ✓ | ✓ | 260 | | | 1280 | | ✓ | |
| 30 | | ✓ | ✓ | 170 | | | 1310 | | ✓ | |
| 31 | | FTR | | | | | | | | |
| 32 | | ✓ | ✓ | 180 | | | 970 | | ✓ | |
| 2 | | ✓ | ✓ | 180 | | | 1340 | | ✓ | |
| 31 | | ✓ | ✓ | 180 | | | 1370 | | ✓ | |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

# ATTACHMENT 4

ERTS
SENSOR ASSEMBLY
9292972
LAT RESULTS SUMMARY

DATE 8-30-83
LOT # FAAT#2
LOT SIZE 82

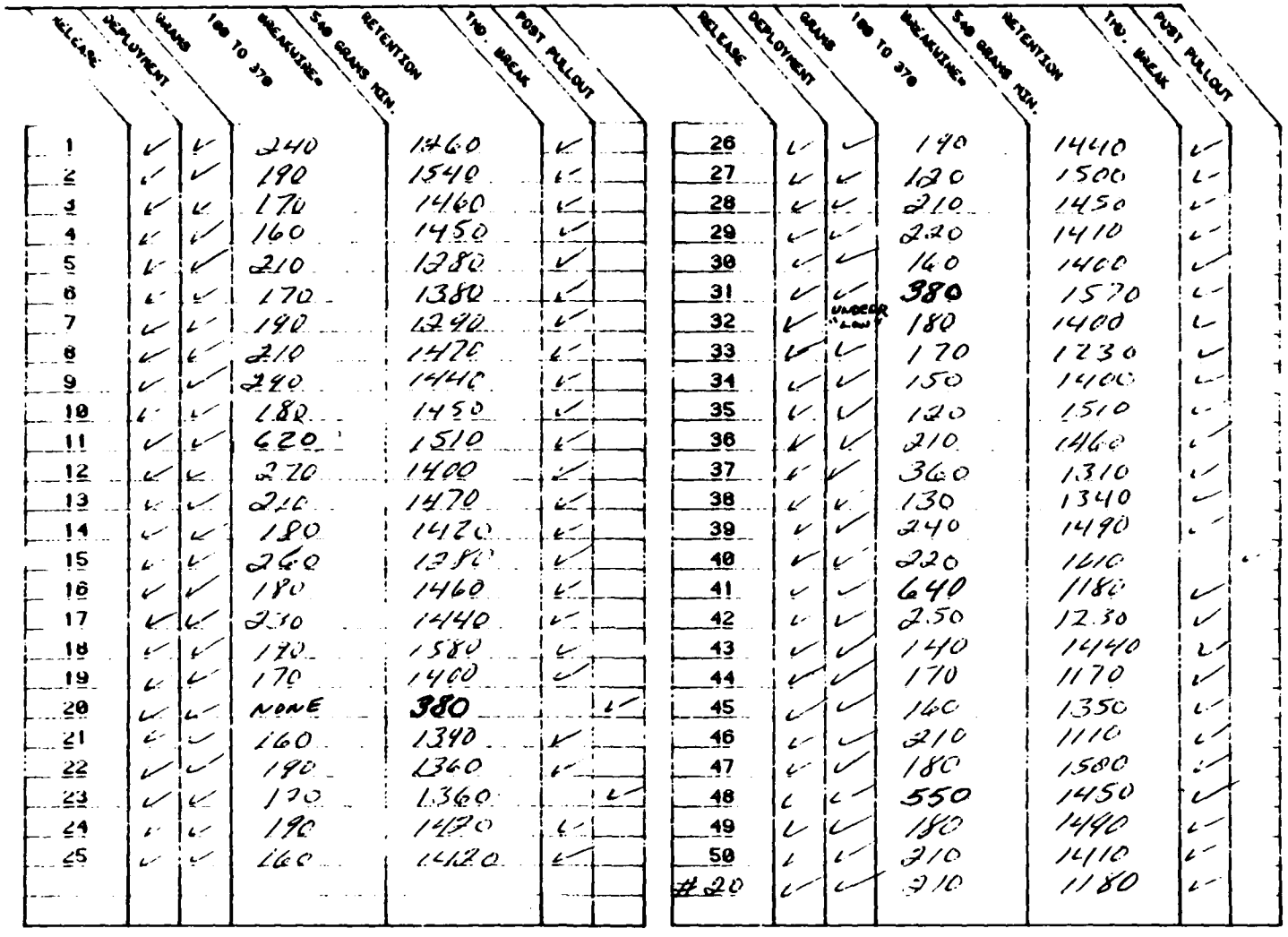
| | |
|---|---|
| B. AMUNDSON | MN29-3681 |
| G. HANSON | MN29-3680 |
| R. JOHNSON | MN29-3680 |
| W. McCABE | MN29-3300 |
| J. SHEEHAN | MN29-3690 |
| D. STACHOWSKI | MN29-3680 |

MIL-S-48755 PARA. 4.4.2.22

| | | RESULTS | | REQUIREMENT | | REMARKS |
|---|---|---|---|---|---|---|
| | | | | | | BLU-92/B ONLY |
| 102 | AMBIENT RELEASE | 0/50 | | 50 | | |
| 102 | COLD RELEASE | 0/32 | | 32 | | |
| 103 | AMBIENT DEPLOYMENT | 1/50 | | 50 | | |
| 103 | COLD DEPLOYMENT | 0/32 | | 32 | | |
| 104 | BREAKWIRE | 9/82 | | 82 | | |
| 105 | POST RETENTION AND THREAD STRENGTH | 2/82 | | 82 | | INFORMATION ONLY |

NOTES :

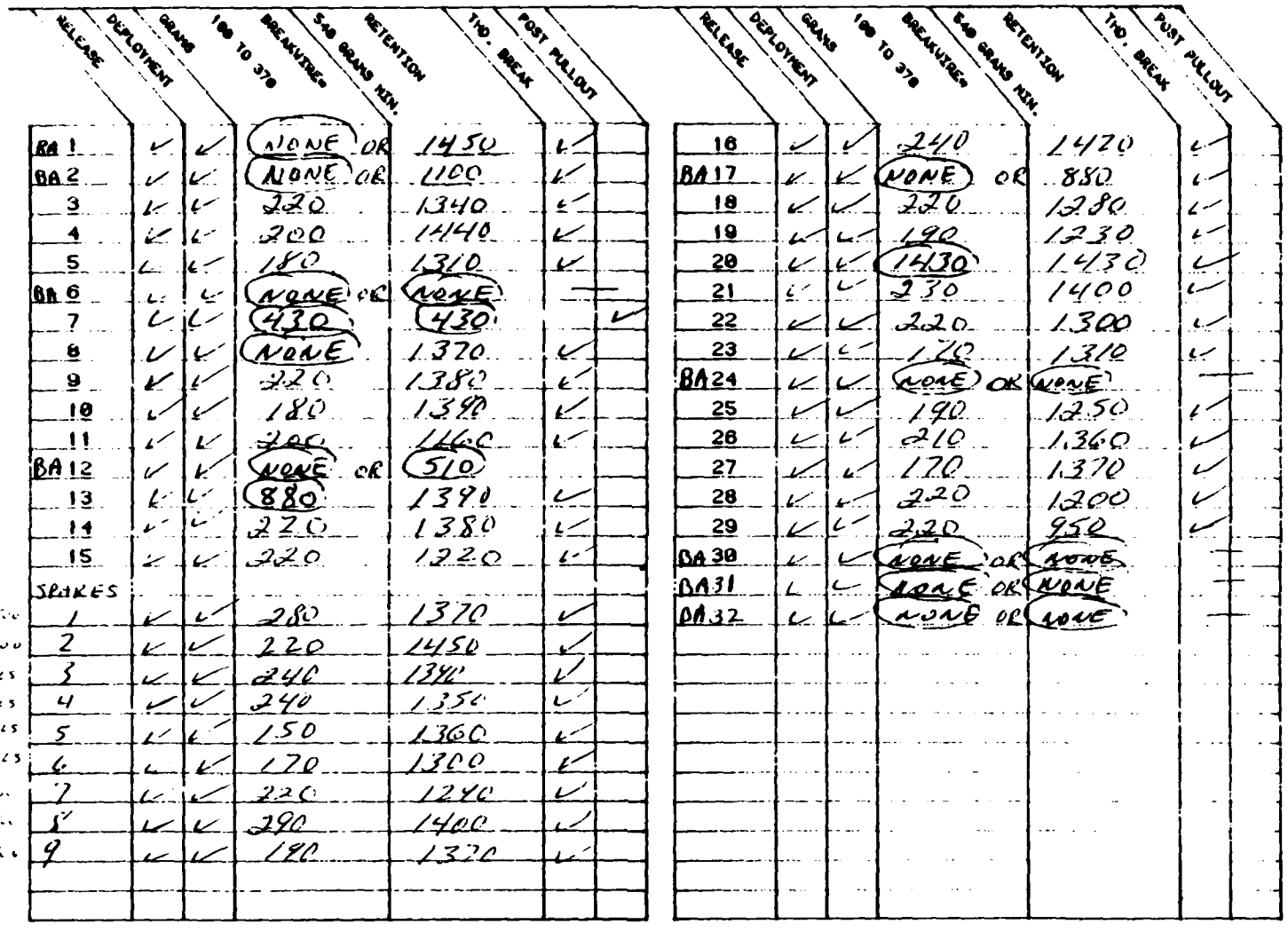
Nine "Blow Apart's" occured during testing. These are not to be counted as any functional failure and spares were tested to finish the test.



| | RELEASE | DEPLOYMENT | GRAINS | 180 TO 370 | MAGAZINE* | 540 GRAINS MIN. | RETENTION | THD. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ✓ | ✓ | | 240 | | | 1460 | | ✓ |
| 2 | ✓ | ✓ | | 190 | | | 1540 | | ✓ |
| 3 | ✓ | ✓ | | 170 | | | 1460 | | ✓ |
| 4 | ✓ | ✓ | | 160 | | | 1450 | | ✓ |
| 5 | ✓ | ✓ | | 210 | | | 1380 | | ✓ |
| 6 | ✓ | ✓ | | 170 | | | 1380 | | ✓ |
| 7 | ✓ | ✓ | | 190 | | | 1490 | | ✓ |
| 8 | ✓ | ✓ | | 210 | | | 1470 | | ✓ |
| 9 | ✓ | ✓ | | 240 | | | 1440 | | ✓ |
| 10 | ✓ | ✓ | | 180 | | | 1450 | | ✓ |
| 11 | ✓ | ✓ | | 620 | | | 1510 | | ✓ |
| 12 | ✓ | ✓ | | 270 | | | 1400 | | ✓ |
| 13 | ✓ | ✓ | | 210 | | | 1470 | | ✓ |
| 14 | ✓ | ✓ | | 180 | | | 1420 | | ✓ |
| 15 | ✓ | ✓ | | 260 | | | 1380 | | ✓ |
| 16 | ✓ | ✓ | | 180 | | | 1460 | | ✓ |
| 17 | ✓ | ✓ | | 230 | | | 1440 | | ✓ |
| 18 | ✓ | ✓ | | 170 | | | 1580 | | ✓ |
| 19 | ✓ | ✓ | | 170 | | | 1400 | | ✓ |
| 20 | ✓ | ✓ | | NONE | | | 380 | | ✓ |
| 21 | ✓ | ✓ | | 160 | | | 1340 | | ✓ |
| 22 | ✓ | ✓ | | 190 | | | 1360 | | ✓ |
| 23 | ✓ | ✓ | | 170 | | | 1360 | | ✓ |
| 24 | ✓ | ✓ | | 190 | | | 1490 | | ✓ |
| 25 | ✓ | ✓ | | 160 | | | 1420 | | ✓ |

| | RELEASE | DEPLOYMENT | GRAINS | 180 TO 370 | MAGAZINE* | 540 GRAINS MIN. | RETENTION | THD. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|---|---|
| 26 | ✓ | ✓ | | 190 | | | 1440 | | ✓ |
| 27 | ✓ | ✓ | | 120 | | | 1500 | | ✓ |
| 28 | ✓ | ✓ | | 210 | | | 1450 | | ✓ |
| 29 | ✓ | ✓ | | 220 | | | 1410 | | ✓ |
| 30 | ✓ | ✓ | | 160 | | | 1460 | | ✓ |
| 31 | ✓ | ✓ | | 380 | | | 1570 | | ✓ |
| 32 | ✓ | UNDER "LOW" | | 180 | | | 1400 | | ✓ |
| 33 | ✓ | ✓ | | 170 | | | 1230 | | ✓ |
| 34 | ✓ | ✓ | | 150 | | | 1400 | | ✓ |
| 35 | ✓ | ✓ | | 120 | | | 1510 | | ✓ |
| 36 | ✓ | ✓ | | 210 | | | 1460 | | ✓ |
| 37 | ✓ | ✓ | | 360 | | | 1310 | | ✓ |
| 38 | ✓ | ✓ | | 130 | | | 1340 | | ✓ |
| 39 | ✓ | ✓ | | 240 | | | 1490 | | ✓ |
| 40 | ✓ | ✓ | | 220 | | | 1610 | | |
| 41 | ✓ | ✓ | | 640 | | | 1180 | | ✓ |
| 42 | ✓ | ✓ | | 250 | | | 1230 | | ✓ |
| 43 | ✓ | ✓ | | 140 | | | 1440 | | ✓ |
| 44 | ✓ | ✓ | | 170 | | | 1170 | | ✓ |
| 45 | ✓ | ✓ | | 160 | | | 1350 | | ✓ |
| 46 | ✓ | ✓ | | 210 | | | 1110 | | ✓ |
| 47 | ✓ | ✓ | | 180 | | | 1580 | | ✓ |
| 48 | ✓ | ✓ | | 550 | | | 1450 | | ✓ |
| 49 | ✓ | ✓ | | 180 | | | 1490 | | ✓ |
| 50 | ✓ | ✓ | | 210 | | | 1410 | | ✓ |
| #20 | ✓ | ✓ | | 210 | | | 1180 | | ✓ |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.



| | RELEASE | DEPLOYMENT | GRAMS | 100 TO 370 BREAKWIRE* | 540 GRAMS MIN. RETENTION | THD. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|
| BA | 1 | ✓ | ✓ | NONE OR | | 1450 | ✓ |
| BA | 2 | ✓ | ✓ | NONE OR | | 1100 | ✓ |
| | 3 | ✓ | ✓ | 220 | | 1340 | ✓ |
| | 4 | ✓ | ✓ | 200 | | 1440 | ✓ |
| | 5 | ✓ | ✓ | 180 | | 1310 | ✓ |
| BA | 6 | ✓ | ✓ | NONE OR | | NONE | — |
| | 7 | ✓ | ✓ | 430 | | 430 | ✓ |
| | 8 | ✓ | ✓ | NONE | | 1370 | ✓ |
| | 9 | ✓ | ✓ | 220 | | 1380 | ✓ |
| | 10 | ✓ | ✓ | 180 | | 1390 | ✓ |
| | 11 | ✓ | ✓ | 240 | | 1460 | ✓ |
| BA | 12 | ✓ | ✓ | NONE OR | | 510 | |
| | 13 | ✓ | ✓ | 880 | | 1390 | ✓ |
| | 14 | ✓ | ✓ | 220 | | 1380 | ✓ |
| | 15 | ✓ | ✓ | 220 | | 1220 | ✓ |
| | SPARES | | | | | | |
| SPARE | 1 | ✓ | ✓ | 280 | | 1370 | ✓ |
| SPARE | 2 | ✓ | ✓ | 220 | | 1450 | ✓ |
| SPARE | 3 | ✓ | ✓ | 240 | | 1340 | ✓ |
| SPARE | 4 | ✓ | ✓ | 240 | | 1350 | ✓ |
| SPARE | 5 | ✓ | ✓ | 150 | | 1360 | ✓ |
| SPARE | 6 | ✓ | ✓ | 170 | | 1300 | ✓ |
| SPARE | 7 | ✓ | ✓ | 220 | | 1240 | ✓ |
| SPARE | 8 | ✓ | ✓ | 290 | | 1400 | ✓ |
| SPARE | 9 | ✓ | ✓ | 180 | | 1320 | ✓ |

| | RELEASE | DEPLOYMENT | GRAMS | 100 TO 370 BREAKWIRE* | 540 GRAMS MIN. RETENTION | THD. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|
| | 16 | ✓ | ✓ | 240 | | 1470 | ✓ |
| BA | 17 | ✓ | ✓ | NONE OR | | 880 | ✓ |
| | 18 | ✓ | ✓ | 220 | | 1280 | ✓ |
| | 19 | ✓ | ✓ | 190 | | 1230 | ✓ |
| | 20 | ✓ | ✓ | 1430 | | 1430 | ✓ |
| | 21 | ✓ | ✓ | 230 | | 1400 | ✓ |
| | 22 | ✓ | ✓ | 220 | | 1300 | ✓ |
| | 23 | ✓ | ✓ | 170 | | 1310 | ✓ |
| BA | 24 | ✓ | ✓ | NONE OR | | NONE | — |
| | 25 | ✓ | ✓ | 190 | | 1250 | ✓ |
| | 26 | ✓ | ✓ | 210 | | 1360 | ✓ |
| | 27 | ✓ | ✓ | 170 | | 1370 | ✓ |
| | 28 | ✓ | ✓ | 220 | | 1200 | ✓ |
| | 29 | ✓ | ✓ | 220 | | 950 | ✓ |
| BA | 30 | ✓ | ✓ | NONE OR | | NONE | — |
| BA | 31 | ✓ | ✓ | NONE OR | | NONE | — |
| BA | 32 | ✓ | ✓ | NONE OR | | NONE | — |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

BA = BLOW APART

OR = ON RELEASE

# ATTACHMENT 5

ERTS
SENSOR ASSEMBLY
9292972
LAT RESULTS SUMMARY

DATE 11-16-83
LOT # 3-1
LOT SIZE 4621

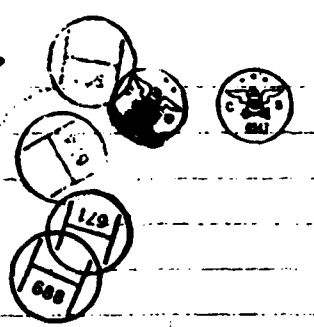
| | | |
|---|---|---|
| B. AMUNDSON | MN29-3681 | |
| G. HANSON | MN29-3680 | |
| R. JOHNSON | MN29-3680 | |
| W. McCABE | MN29-3300 | |
| J. SHEEHAN | MN29-3690 | |
| D. STACHOWSKI | MN29-3680 | |

MIL-S-48755 PARA. 4.4.2.22

| | RESULTS | | REQUIREMENT | | REMARKS |
|---|---|---|---|---|---|
| 101 NON-RELEASE | N/A | | 80-2-3 | | BLU-92/B ONLY |
| 102 AMBIENT RELEASE | 0/50 | | 50-1-2 | | |
| 102 COLD RELEASE | 0/50 | | 30-1-2 | | |
| 103 AMBIENT DEPLOYMENT | 0/50 | | 50-3-4 | | |
| 103 COLD DEPLOYMENT | 0/50 | | 30-2-3 | | |
| 104 BREAKWIRE | 1/80 | | 80-5-6 | | |
| 105 POST RETENTION AND THREAD STRENGTH | 3/80 | | 80 | | INFORMATION ONLY |

NOTES :

11-21-83
11-21-83
11-21-83
11-21-83
11-22-83



| | RELEASE | DEPLOYMENT | GRAINS | 100 TO 370 | BREAKLOOSE* | 540 GRAINS MIN. | RETENTION | TWO. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ✓ | ✓ | ✓ | 190 | | | 1190 | | ✓ |
| 2 | ✓ | ✓ | ✓ | 210 | | | 1200 | | ✓ |
| 3 | ✓ | ✓ | ✓ | 210 | | | 1330 | | ✓ |
| 4 | ✓ | ✓ | ✓ | 180 | | | 1380 | | ✓ |
| 5 | ✓ | ✓ | ✓ | 160 | | | 1330 | | ✓ |
| 6 | ✓ | ✓ | ✓ | 130 | | | 1310 | | ✓ |
| 7 | ✓ | ✓ | ✓ | 230 | | | 1210 | | ✓ |
| 8 | ✓ | ✓ | ✓ | 170 | | | 1460 | | ✓ |
| 9 | ✓ | ✓ | ✓ | 220 | | | 910 | | ✓ |
| 10 | ✓ | ✓ | ✓ | 200 | | | 1260 | | ✓ |
| 11 | ✓ | ✓ | ✓ | 220 | | | 1560 | | ✓ |
| 12 | ✓ | ✓ | ✓ | 170 | | | 1510 | | ✓ |
| 13 | ✓ | ✓ | ✓ | 120 | | | 1450 | | ✓ |
| 14 | ✓ | ✓ | ✓ | 170 | | | 1480 | | ✓ |
| 15 | ✓ | ✓ | ✓ | 210 | | | 1230 | | ✓ |
| 16 | ✓ | ✓ | ✓ | 150 | | | 1390 | | ✓ |
| 17 | ✓ | ✓ | ✓ | 240 | | | 1440 | | ✓ |
| 18 | ✓ | ✓ | ✓ | 200 | | | 1000 | | ✓ |
| 19 | ✓ | ✓ | ✓ | 200 | | | 880 | | ✓ |
| 20 | ✓ | ✓ | ✓ | 210 | | | 1370 | | ✓ |
| 21 | ✓ | ✓ | ✓ | 250 | | | 1250 | | ✓ |
| 22 | ✓ | ✓ | ✓ | 160 | | | 1180 | | ✓ |
| 23 | ✓ | ✓ | ✓ | 260 | | | 1330 | | ✓ |
| 24 | ✓ | ✓ | ✓ | 170 | | | 1250 | | ✓ |
| 25 | ✓ | ✓ | ✓ | 230 | | | 1420 | | ✓ |

| | RELEASE | DEPLOYMENT | GRAINS | 100 TO 370 | BREAKLOOSE* | 540 GRAINS MIN. | RETENTION | TWO. BREAK | POST PULLOUT |
|---|---|---|---|---|---|---|---|---|---|
| 26 | ✓ | ✓ | ✓ | 290 | | | 1180 | | ✓ |
| 27 | ✓ | ✓ | ✓ | 160 | | | 1370 | | ✓ |
| 28 | ✓ | ✓ | ✓ | 220 | | | 1410 | | ✓ |
| 29 | ✓ | ✓ | ✓ | 210 | | | 1280 | | ✓ |
| 30 | ✓ | ✓ | ✓ | 150 | | | 1400 | | ✓ |
| 31 | ✓ | ✓ | ✓ | 230 | | | 1250 | | ✓ |
| 32 | ✓ | ✓ | ✓ | 240 | | | 1330 | | ✓ |
| 33 | ✓ | ✓ | ✓ | 280 | | | 370 | | ✓ |
| 34 | ✓ | ✓ | ✓ | 280 | | | 1390 | | ✓ |
| 35 | ✓ | ✓ | ✓ | 190 | | | 1500 | | ✓ |
| 36 | ✓ | ✓ | ✓ | 120 | | | 1500 | | ✓ |
| 37 | ✓ | ✓ | ✓ | 270 | | | 1170 | | ✓ |
| 38 | ✓ | ✓ | ✓ | 140 | | | 1480 | | ✓ |
| 39 | ✓ | ✓ | ✓ | 230 | | | 1380 | | ✓ |
| 40 | ✓ | ✓ | ✓ | 210 | | | 370 | | ✓ |
| 41 | ✓ | ✓ | ✓ | 260 | | | 1470 | | ✓ |
| 42 | ✓ | ✓ | ✓ | 110 | | | 1370 | | ✓ |
| 43 | ✓ | ✓ | ✓ | 210 | | | 1380 | | ✓ |
| 44 | ✓ | ✓ | ✓ | 230 | | | 1470 | | ✓ |
| 45 | ✓ | ✓ | ✓ | 120 | | | 1430 | | ✓ |
| 46 | ✓ | ✓ | ✓ | 220 | | | 670 | | ✓ |
| 47 | ✓ | ✓ | ✓ | 190 | | | 920 | | ✓ |
| 48 | ✓ | ✓ | ✓ | 200 | | | 1420 | | ✓ |
| 49 | ✓ | ✓ | ✓ | 240 | | | 1310 | | ✓ |
| 50 | ✓ | ✓ | ✓ | 220 | | | 1180 | | ✓ |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

| | RELEASE | DEPLOYMENT | GRAMS | 180 TO 270 | BREAKSTRENGTH | 540 GRAMS MIN. | RETENTION | TWD. BREAK | POST PULLOUT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ✓ | ✓ | | 260 | | | 1510 | | ✓ | |
| 2 | ✓ | ✓ | | 300 | | | 1310 | | ✓ | |
| 3 | ✓ | ✓ | | 240 | | | 1170 | | ✓ | |
| 4 | ✓ | ✓ | | 240 | | | 1460 | | ✓ | |
| 5 | ✓ | ✓ | | 230 | | | 1410 | | ✓ | |
| 6 | ✓ | ✓ | | 210 | | | 1460 | | ✓ | |
| 7 | ✓ | ✓ | | 260 | | | 1270 | | ✓ | |
| 8 | ✓ | ✓ | | 270 | | | 1480 | | ✓ | |
| 9 | ✓ | ✓ | | 210 | | | 1400 | | ✓ | |
| 10 | ✓ | ✓ | | 210 | | | 1530 | | ✓ | |
| 11 | ✓ | ✓ | | 220 | | | 1400 | | ✓ | |
| 12 | ✓ | ✓ | | 220 | | | 1130 | | ✓ | |
| 13 | ✓ | ✓ | | 240 | | | 1380 | | ✓ | |
| 14 | ✓ | ✓ | | 230 | | | 1450 | | ✓ | |
| 15 | ✓ | ✓ | | 260 | | | 1440 | | ✓ | |

| | RELEASE | DEPLOYMENT | GRAMS | 180 TO 270 | BREAKSTRENGTH | 540 GRAMS MIN. | RETENTION | TWD. BREAK | POST PULLOUT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ✓ | ✓ | | 260 | | | 1280 | | ✓ | |
| 17 | ✓ | ✓ | | 190 | | | 1390 | | ✓ | |
| 18 | ✓ | ✓ | | 190 | | | 1360 | | ✓ | |
| 19 | | | | 180 | | | 1450 | | ✓ | |
| 20 | ✓ | ✓ | | 230 | | | 1440 | | ✓ | |
| 21 | ✓ | ✓ | | POST PULLED ON RELEASE | | | | | ✓ | |
| 22 | ✓ | ✓ | | 170 | | | 1440 | | ✓ | |
| 23 | ✓ | ✓ | | 180 | | | 1220 | | | ✓ |
| 24 | ✓ | ✓ | | 190 | | | 1330 | | ✓ | |
| 25 | ✓ | ✓ | | 260 | | | 1480 | | ✓ | |
| 26 | ✓ | ✓ | | 160 | | | 1340 | | ✓ | |
| 27 | ✓ | ✓ | | 260 | | | 1250 | | ✓ | |
| 28 | ✓ | ✓ | | 300 | | | 1070 | | ✓ | |
| 29 | ✓ | ✓ | | 270 | | | 1210 | | ✓ | |
| 30 | ✓ | ✓ | | 260 | | | 1400 | | | ✓ |
| #21 | ✓ | ✓ | | 170 | | | 1490 | | ✓ | |

* NOTE: NO MORE THAN ONE OF THE FIVE ALLOWABLE DEFECTIVES SHALL EXCEED 544 GRAMS.

# APPENDIX B
# ENGINEERING TEST REPORT OEXM 32211

**Honeywell**

# ENGINEERING TEST REPORT

| | |
|---|---|
| ☐ AVIONICS | DATE: 12-29-83 |
| ☒ DEFENSE SYSTEMS | REPORT NUMBER: OEXM 32211 |
| | DEVELOPMENT NUMBER: S4594-AA-6000-2759 |
| | PAGE: 1 OF 7 |
| ISSUED BY: NB103 - D & E Lab | CONTRACT NUMBER: DAAK10-83-C-0049 |

COPYLIST:

| | |
|---|---|
| B. Amundson | MN29-3681 |
| R. Currie | MN29-3553 |
| J. Funk | MN29-3682 |
| J. Haley | MN29-3553 |
| J.Lundquist(3) | MN04-1200 |
| T. Martorano | MN29-3682 |
| D. Stachowski | MN29-3680 |
| D. Swanson | MN11-1430 |
| M. Weidenbach | MN29-3680 |
| L. Wilder | MN11-1430 |
| D & E File | MN11-1430 |
| Uniterm File | MN11-1430 |

KEYWORDS:

GEMSS, XM74
Sensor, Extended
Leakage Rate

ATTACHMENTS:

I Leakage Test Plan (2)
II Langlie Test Plan (2)

UNITS TESTED:

One hundred thirty-five Extended Range Tripline Sensors (9292972 Modified). Modifications consist of the 9298598-1 diaphragm, 0.0035 ± .0001 diameter breakwire and 320 ± 8 Decitrex Thread.

OBJECT OF TEST:

Conduct Leakage Rate and Langlie One-Shot Release Tests as outlined in Attachments I and II.

DOCUMENTATION:

See attached data sheets.

PROCEDURE AND RESULTS:

Leakage Rate:

Each unit was tested as shown on the attached Test Plan except the Nicolet Oscilloscope was set on a slow trace and started before applying pressure to the sensor. The starting pressure (supply pressure cut-off) and the fixture pressure at 30 second intervals as shown in the data sheets were read from the scope trace.

Langlie Test:

Each test was conducted as shown on the attached Test Plan. Initial "no release" and "all release" limits were set at 50 psi and 350 psi respectively.

| | | | |
|---|---|---|---|
| DATA BOOK NUMBER: 0-2431 | PAGE: 112-117 | TEST STARTED: 12-5-83 | TEST COMPLETED: 12-16-83 |
| REQUESTED BY: M. Weidenbach | DATE: 12-1-83 | WRITTEN BY: J. Funk/T. Martorano | |
| DEPARTMENT: Production Engineering | | APPROVED BY: L. D. Wilder | |

HE-448 REV 12/78

Initial Leakage Test (75 psi nominal) SHEET 2

| | Chamber Pressure (psi) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seq # | Initial | @ 30 sec | @ 60 sec | @ 90 sec | @ 120 sec | @ 150 sec | @ 180 sec | @ 210 sec | @ 240 sec | @ 270 sec | @ 300 sec | @ 330 sec | @ 360 sec | @ 390 sec |
| 1 | 76.6 | 71.3 | 62.7 | 55.4 | 49.6 | 45.6 | 42.1 | 39.6 | 37.8 | 36.5 | 35.7 | 35.0 | 34.5 | 34.4 |
| 2 | 75.1 | 71.3 | 66.8 | 64.8 | 61.3 | 58.2 | 56.1 | 52.7 | 51.2 | 49.7 | 48.3 | 47.1 | 46.0 | 45.5 |
| 3 | 80.0 | 75.8 | 69.3 | 63.0 | 58.1 | 53.7 | 50.0 | 47.7 | 45.2 | 43.1 | 42.0 | 40.6 | 39.3 | 38.5 |
| 4 | 80.0 | 72.4 | 61.8 | 54.4 | 47.9 | 42.4 | 38.1 | 35.7 | 33.8 | 30.8 | 29.5 | 28.4 | 28.0 | 27.4 |
| 5 | 78.0 | 65.8 | 57.8 | 50.6 | 44.2 | 38.6 | 34.0 | 28.7 | 26.3 | 23.1 | 20.8 | 18.2 | 15.9 | 14.2 |
| 6 | 80.0 | 70.7 | 59.1 | 53.4 | 47.1 | 41.5 | 38.0 | 34.9 | 32.4 | 30.6 | 29.4 | 28.6 | 27.9 | 27.3 |
| 7 | 77.1 | 66.8 | 57.6 | 49.8 | 43.4 | 38.0 | 33.7 | 29.8 | 26.8 | 24.3 | 21.9 | 20.1 | 18.5 | 16.6 |
| 8 | 78.1 | 74.1 | 68.3 | 62.3 | 56.8 | 52.3 | 48.4 | 45.2 | 43.1 | 39.6 | 37.1 | 35.0 | 33.0 | 31.0 |
| 9 | 76.7 | 60.1 | 45.8 | 36.8 | 30.6 | 25.4 | 22.3 | 19.9 | 17.9 | 16.6 | 15.6 | 15.1 | 14.4 | 14.0 |
| 10 | 75.8 | 59.2 | 47.0 | 37.9 | 31.0 | 26.1 | 22.5 | 19.3 | 16.9 | 15.5 | 14.3 | 13.5 | 12.7 | 11.5 |
| 11 | 76.9 | 61.1 | 47.9 | 39.2 | 33.5 | 29.4 | 25.9 | 24.6 | 21.8 | 20.4 | 19.1 | 18.2 | 17.3 | 17.0 |
| 12 | 77.8 | 59.1 | 45.4 | 35.6 | 28.6 | 24.0 | 20.5 | 17.9 | 16.5 | 14.8 | 13.7 | 13.1 | 12.7 | 12.8 |
| 13 | 73.8 | 68.6 | 58.6 | 45.9 | 39.0 | 33.7 | 29.4 | 25.6 | 22.5 | 21.7 | 19.9 | 18.3 | 16.1 | 15.6 |
| 14 | 75.8 | 61.5 | 49.5 | 39.8 | 32.4 | 26.7 | 22.1 | 18.6 | 16.1 | 15.8 | 11.9 | 10.8 | 9.8 | 8.6 |
| 15 | 78.1 | 64.1 | 54.4 | 46.6 | 40.5 | 35.1 | 31.3 | 28.1 | 25.6 | 23.4 | 21.6 | 20.2 | 19.2 | 18.4 |
| 16 | 76.8 | 63.7 | 63.1 | 57.3 | 52.0 | 47.8 | 44.1 | 40.7 | 38.3 | 36.2 | 34.3 | 32.2 | 30.7 | 29.4 |
| 17 | 75.3 | 64.1 | 52.5 | 43.7 | 36.8 | 31.0 | 26.4 | 23.0 | 20.1 | 17.7 | 16.0 | 14.0 | 13.3 | 12.4 |
| 18 | 76.7 | 60.2 | 48.5 | 33.4 | 24.4 | 18.4 | 14.5 | 11.8 | 10.1 | 9.4 | 9.0 | 0 | — | — |
| 19 | 76.4 | 71.6 | 64.6 | 57.9 | 51.7 | 46.6 | 42.1 | 38.5 | 35.1 | 32.7 | 30.3 | 28.6 | 27.1 | 25.6 |
| 20 | 75.8 | 67.4 | 59.1 | 51.7 | 45.4 | 40.2 | 35.8 | 32.3 | 29.5 | 26.9 | 25.2 | 23.4 | 22.3 | 21.4 |
| 21 | 76.6 | 69.3 | 61.1 | 54.2 | 48.6 | 43.6 | 39.5 | 36.1 | 33.5 | 31.4 | 29.2 | 27.7 | 26.2 | 25.3 |
| 22 | 74.8 | 69.5 | 65.2 | 61.2 | 57.2 | 53.6 | 51.0 | 48.1 | 45.7 | 43.6 | 41.8 | 40.4 | 39.5 | 38.7 |
| 23 | 75.4 | 52.9 | 41.4 | 36.6 | 30.0 | 25.5 | 21.7 | 19.4 | 17.5 | 16.1 | 15.4 | 14.5 | 14.1 | 13.8 |
| 24 | 75.2 | 50.6 | 35.3 | 26.1 | 20.4 | 16.6 | 14.1 | 12.3 | 11.2 | 10.7 | 10.1 | 9.8 | 9.3 | 9.0 |
| 25 | 75.8 | 0 | (31.7 @ 5 sec, 15.0 @ 10 sec, 8.5 @ 15 sec, 7.2 @ 20 sec) | | | | | | | | — | — | — | — |
| 26 | 75.6 | 64.5 | 54.1 | 46.5 | 40.9 | 36.9 | 33.9 | 31.8 | 29.3 | 25.5 | 24 | 22.5 | 21.2 | 20.3 |
| 27 | 75.3 | 52.8 | 44.6 | 36.8 | 30.9 | 26.6 | 23.6 | 20.9 | 19.1 | 17.6 | 16.6 | 15.9 | 15.2 | 14.7 |
| 28 | 75.0 | 67.5 | 59.7 | 52.5 | 46.4 | 41.3 | 36.9 | 33.5 | 30.8 | 28.4 | 26.0 | 24.2 | 22.1 | 19.6 |
| 29 | 74.3 | 59.8 | 50.4 | 42.4 | 36.1 | 30.9 | 26.8 | 23.4 | 20.8 | 18.8 | 17.2 | 16.5 | 16.3 | 14.8 |
| 30 | 74.8 | 8.8 | (7.5 @ 35 sec, 0 @ 40 sec) | | | | — | — | — | — | — | — | — | — |
| | | | | | | | | | | | | | | |

INITIAL LEAKAGE TEST (25 PSI NOMINAL) SHEET #

| | Chamber Pressure (PSI) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Initial | @ 30 sec | @ 60 sec | @ 90 sec | @ 120 sec | @ 150 sec | @ 180 sec | @ 210 sec | @ 240 sec | @ 270 sec | @ 300 sec | @ 330 sec | @ 360 sec | @ 390 sec |
| 31 | 78.0 | 75.0 | 70.5 | 66.5 | 62.7 | 59.3 | 56.1 | 53.5 | 50.7 | 48.0 | 45.0 | 43.1 | 41.3 | 40.3 |
| 32 | 76.4 | 73.5 | 69.9 | 67.0 | 64.1 | 61.3 | 59.0 | 56.4 | 54.3 | 52.3 | 50.1 | 48.4 | 46.4 | 44.8 |
| 33 | 76.2 | 65.6 | 57.1 | 50.2 | 44.9 | 40.6 | 36.9 | 33.7 | 30.9 | 28.4 | 26.4 | 24.9 | 23.3 | 22.0 |
| 34 | 75.6 | 74.0 | 72.0 | 71.4 | 70.0 | 68.5 | 66.9 | 65.6 | 63.9 | 62.8 | 61.6 | 60.2 | 59.4 | 56.1 |
| 35 | 76.5 | 64.4 | 55.0 | 47.3 | 41.2 | 36.0 | 31.3 | 27.7 | 24.3 | 21.5 | 19.0 | 17.0 | 15.1 | 13.0 |

## Release Pressure Leakage Test

SHEET 1

| | Chamber Pressure (Psi) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Initial Reading | @ 30 sec | @ 60 sec | @ 90 sec | @ 120 sec | @ 150 sec | @ 180 sec | @ 210 sec | @ 240 sec | @ 270 sec | @ 300 sec | @ 330 sec | @ 360 sec | @ 390 sec |
| 1 | 184.0 | 93.5 | 57.0 | 40.5 | 34.0 | 30.0 | 25.0 | 17.5 | 0 | — | — | — | — | — |
| 2 | 194.0 | 182.0 | 178.0 | 162.5 | 158.0 | 150.0 | 142.5 | 136.5 | 131.5 | 126.5 | 121.5 | 117.0 | 114.0 | 111.5 |
| 3 | 138.5 | 116.5 | 102.5 | 70.0 | 25.0 | 63.0 | 61.0 | 54.0 | 48.5 | 42.5 | 38.0 | 34.0 | 29.5 | 27.0 |
| 4 | 135.0 | 108.0 | 82.5 | 72.0 | 60.5 | 50.0 | 42.0 | 36.0 | 31.0 | 22.0 | 23.0 | 20.0 | 19.0 | 17.0 |
| 5 | 141.0 | 120.5 | 104.5 | 91.0 | 79.0 | 69.0 | 60.0 | 52.5 | 46.5 | 41.0 | 37.0 | 34.0 | 30.5 | 27.0 |
| 6 | 145.0 | 51.0 | 41.0 | 38.5 | 36.0 | 38.5 | 31.0 | 29.5 | 28.0 | 27.0 | 25.0 | 25.0 | 24.5 | 24.5 |
| 7 | 142.5 | 116.0 | 94.0 | 79.5 | 66.5 | 56.0 | 47.5 | 40.5 | 35.0 | 31.0 | 27.5 | 24.5 | 21.5 | 19.5 |
| 8 | 121.0 | 96.5 | 71.0 | 55.5 | 44.0 | 56.0 | 30.0 | 24.5 | 21.5 | 19.5 | 17.0 | 16.0 | 15.5 | 15.0 |
| 9 | 105.5 | 74.0 | 54.5 | 41.0 | 32.0 | 25.5 | 21.0 | 16.5 | 15.0 | 13.5 | 12.5 | 11.5 | 11.0 | 9.5 |
| 10 | 142.0 | 99.5 | 70.0 | 51.5 | 39.0 | 29.0 | 23.5 | 19.0 | 17.0 | 15.0 | 13.5 | 12.0 | 10.5 | 9.0 |
| 11 | 121.5 | 102.0 | 83.5 | 74.5 | 64.0 | 56.0 | 49.0 | 44.0 | 38.0 | 34.0 | 30.5 | 28.0 | 25.0 | 23.5 |
| 12 | 148.0 | 64.5 | 31.0 | 16.0 | 13.5 | 0 | — | — | — | — | — | — | — | — |
| 13 | 122.5 | 108.5 | 96.0 | 86.0 | 74.5 | 61.5 | 50.5 | 42.0 | 35.0 | 29.0 | 23.5 | 20.5 | 17.0 | 14.0 |
| 14 | 116.5 | 102.5 | 94.0 | 73.0 | 57.0 | 46.5 | 37.0 | 29.5 | 23.5 | 18.5 | 15.5 | 13.0 | 13.0 | 11.5 |
| 15 | 141.5 | 87.5 | 54.5 | 35.5 | 28.0 | 23.0 | 19.0 | 18.5 | 0 | — | — | — | — | — |
| 16 | 128.0 | 107.5 | 91.0 | 77.5 | 66.5 | 56.0 | 48.0 | 42.0 | 36.0 | 32.0 | 27.0 | 23.0 | 20.0 | 18.5 |
| 17 | 116.0 | 88.5 | 66.0 | 50.5 | 37.0 | 26.0 | 22.0 | 21.0 | 15.0 | 10.5 | 6.5 | 5.5 | 1.5 | 0 |
| 18 | 126.5 | 104.5 | 85.5 | 67.0 | 50.5 | 35.0 | 21.0 | 10.5 | 1.0 | 0 | — | — | — | — |
| 19 | 132.0 | 105.5 | 100.0 | 91.5 | 82.5 | 75.0 | 67.5 | 61.5 | 55.5 | 50.5 | 46.0 | 42.0 | 38.5 | 35.0 |
| 20 | 121.0 | 104.5 | 86.5 | 71.5 | 59.0 | 48.0 | 40.5 | 33.5 | 27.0 | 22.5 | 19.0 | 15.0 | 12.5 | 8.5 |
| 21 | 91.0 | 76.5 | 64.5 | 55.0 | 47.0 | 40.0 | 34.5 | 29.5 | 26.0 | 24.0 | 18.5 | 16.0 | 13.0 | 11.0 |
| 22 | 96.0 | 82.0 | 73.5 | 66.0 | 59.0 | 54.0 | 49.0 | 44.0 | 40.0 | 36.5 | 33.5 | 33.0 | 32.0 | 30.0 |
| 23 | 124.5 | 104.5 | 88.5 | 74.5 | 64.0 | 55.0 | 46.5 | 40.5 | 35.0 | 28.5 | 25.0 | 24.0 | 18.5 | 16.0 |
| 24 | 142.5 | 116.5 | 94.0 | 76.5 | 66.0 | 52.5 | 39.5 | 16.5 | 10.0 | 6.0 | 2.5 | 0.5 | 0 | — |
| 25 | 123.0 | 104.0 | 87.0 | 76.0 | 65.0 | 56.0 | 48.0 | 42.0 | 36.0 | 31.0 | 27.0 | 23.5 | 20.5 | 17.5 |
| 26 | 119.5 | 40.5 | 20.0 | 9.5 | 6.5 | 0 | — | — | — | — | — | — | — | — |
| 27 | 109 | 73.5 | 56.0 | 44.0 | 35.5 | 15.5 | 9.5 | 5.0 | 4.5 | 3.5 | 2.5 | 2.5 | 2.0 | 2.0 |
| 28 | 121.5 | 104.0 | 90.5 | 76.5 | 69.0 | 60.5 | 53.5 | 48.0 | 43.5 | 39.0 | 36.0 | 33.5 | 30.5 | 28.5 |
| 29 | 120.5 | 92.5 | 72.0 | 56.5 | 46.0 | 38.0 | 31.5 | 27.0 | 23.5 | 19.5 | 16.5 | 15.0 | 14.0 | 12.5 |
| 30 | 104.0 | 79.0 | 60.0 | 47.0 | 37.0 | 29.0 | 23.5 | 19.5 | 14.5 | 14.0 | 11.0 | 10.5 | 9.0 | 8.0 |
| | | | | | | | | | | | | | | |

## RELEASE PRESSURE LEAKAGE TEST SHEET II

| | Chamber Pressure (psi) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Initial Pressure | @ 30 sec | @ 60 sec | @ 90 sec | @ 120 sec | @ 150 sec | @ 180 sec | @ 210 sec | @ 240 sec | @ 270 sec | @ 300 sec | @ 330 sec | @ 360 sec | @ 390 sec |
| 31 | 120.0 | 110.0 | 101.0 | 94.0 | 86.0 | 80.0 | 74.0 | 68.0 | 64.0 | 58.5 | 54.0 | 51.0 | 47.5 | 45.0 |
| 32 | 117.0 | 110.0 | 103.0 | 96.5 | 89.5 | 85.5 | 80.5 | 75.0 | 71.0 | 67.0 | 63.0 | 59.5 | 56.5 | 53.5 |
| 33 | 123.0 | 112.0 | 100.0 | 89.5 | 80.5 | 72.5 | 66.0 | 58.0 | 53.5 | 48.5 | 44.0 | 39.5 | 36.5 | 34.0 |
| 34 | 126.0 | 124.0 | 122.5 | 119.0 | 116.0 | 112.5 | 110.0 | 107.5 | 105.0 | 102.0 | 100.0 | 97.5 | 94.5 | 92.5 |
| 35 | 123.5 | 99.0 | 80.5 | 68.0 | 57.0 | 49.0 | 43.0 | 37.0 | 33.0 | 29.5 | 26.0 | 23.5 | 21.0 | 19.5 |

LEAKAGE TEST - BREAK WIRE & TRIP LINE FORCE

| Unit | Break. wire (GRAMS) | Trip line (GRAMS) |
|---|---|---|
| 1 | 230 | 920 |
| 2 | 250 | 940 |
| 3 | 260 | 1350 |
| 4 | 180 | 1020 |
| 5 | 240 | 1040 |
| 6 | 250 | 1200 |
| 7 | 280 | 1020 |
| 8 | 200 | 1400 |
| 9 | 190 | 1310 |
| 10 | 220 | 1340 |
| 11 | 240 | 1130 |
| 12 | 290 | 1200 |
| 13 | 240 | 1050 |
| 14 | 210 | 1330 |
| 15 | 180 | 1040 |
| 16 | 240 | 1120 |
| 17 | 250 | 1260 |
| 18 | 240 | 1330 |
| 19 | 220 | 1140 |
| 20 | 230 | 1440 |
| 21 | 240 | 1200 |
| 22 | 230 | 1310 |
| 23 | 240 | 1230 |
| 24 | 220 | 1140 |
| 25 | 260 | 1320 |
| 26 | 240 | 1120 |
| 27 | 200 | 1040 |
| 28 | 260 | 1220 |
| 29 | 230 | 1250 |
| 30 | 250 | 1160 |
| 31 | 230 | 1330 |
| 32 | 260 | 1410 |
| 33 | 220 | 1240 |
| 34 | 280 | 1180 |
| 35 | 220 | 650 |

LANYARD Release TEST

| 50 ms Pulse | | | | | 75 ms. Pulse | | | | | 100 ms Pulse | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Press (Psi) | Release | Non Release | | Unit | Press (Psi) | Release | Non Release | | Unit | Press (Psi) | Release | Non Release |
| 1 | 200 | X | | | 31 | 200 | X | | | 61 | 200 | X | |
| 2 | 125 | X | | | 32 | 125 | X | | | 62 | 125 | X | |
| 3 | 87.5 | | O | | 33 | 87.5 | | O | | 63 | 87.5 | | O |
| 4 | 106.25 | X | | | 34 | 106.25 | | O | | 64 | 106.25 | | O |
| 5 | 96.75 | | O | | 35 | 228 | X | | | 65 | 228 | X | |
| 6 | 101.5 | | O | | 36 | 139 | X | | | 66 | 139 | X | |
| 7 | 225 | X | | | 37 | 84.5 | | O | | 67 | 84.5 | | O |
| 8 | 160 | X | | | 38 | 116.5 | | O | | 68 | 116.5 | X | |
| 9 | 130 | | O | | 39 | 139 | X | | | 69 | 103 | | O |
| 10 | 145 | X | | | 40 | 132.5 | | O | | 70 | 110 | | O |
| 11 | 137.5 | X | | | 41 | 146.5 | X | | | 71 | 169 | X | |
| 12 | 93.75 | | O | | 42 | 143 | X | | | 72 | 144.5 | X | |
| 13 | 116 | | O | | 43 | 140 | X | | | 73 | 127 | X | |
| 14 | 138 | X | | | 44 | 95 | | O | | 74 | 118.5 | | O |
| 15 | 127 | X | | | 45 | 117 | | O | | 75 | 122.5 | X | |
| 16 | 121 | | O | | 46 | 128 | X | | | 76 | 120 | X | |
| 17 | 128 | X | | | 47 | 122.5 | X | | | 77 | 119 | | O |
| 18 | 124.5 | X | | | 48 | 120 | X | | | 78 | 240 | X | |
| 19 | 87 | | O | | 49 | 118.5 | | O | | 79 | 111 | X | |
| 20 | 105 | | O | | 50 | 119 | | O | | 80 | 92.5 | | O |
| 21 | 116 | | O | | 51 | 130 | X | | | 81 | 121 | X | |
| 22 | 127 | X | | | 52 | 125 | | O | | 82 | 108.5 | X | |
| 23 | 121 | X | | | 53 | 122.5 | X | | | 83 | 115.5 | | O |
| 24 | 118 | | O | | 54 | 126.5 | X | | | 84 | 118 | | O |
| 25 | 123 | X | | | 55 | 122.5 | | O | | 85 | 131.5 | X | |
| 26 | 121 | X | | | 56 | 124.5 | | O | | 86 | 125 | | O |
| 27 | 119.5 | | O | | 57 | 127 | X | | | 87 | 128 | X | |
| 28 | 123 | | O | | 58 | 126 | X | | | 88 | 126.5 | X | |
| 29 | 125.5 | | O | | 59 | 125 | X | | | 89 | 121 | | O |
| 30 | 126 | X | | | 60 | 82.5 | | O | | 90 | 124 | X | |

# TEST PLAN

## GEMMS/ERTS LEAKAGE TEST

1.0 Purpose

The purpose of the test is to determine the rate of pressure leakdown through the sensor.

2.0 Test Procedure

2.1 Initial leakage.

2.1.1 Install sensor in release socket of pressure chamber.

2.1.2 Pressurize chamber with nitrogen gas to 75±5 psi.

2.1.3 Close shut off valve to chamber and start Nicolet Oscilloscope trace.

2.1.4 Record pressure trace on Floppy Disc.

2.2 Function and leakage

2.2.1 Attach continuity meter to breakwire leads for continuous monitoring.

2.2.2 Increase pressure in the chamber at a steady rate until tripline deploys or to 300±10 psi.

2.2.3 Close shutoff valve to chamber and start Nicolet Oscilloscope trace.

2.2.4 Record pressure trace on Floppy Disc.

2.2.5 Pull trip line along longitudinal axis of sensor and record the force to break the break wire and the force to break the trip line.

2.3 Repeat (2.1) and (2.2) on 35 sensors at ambient temperature (75±10°F).

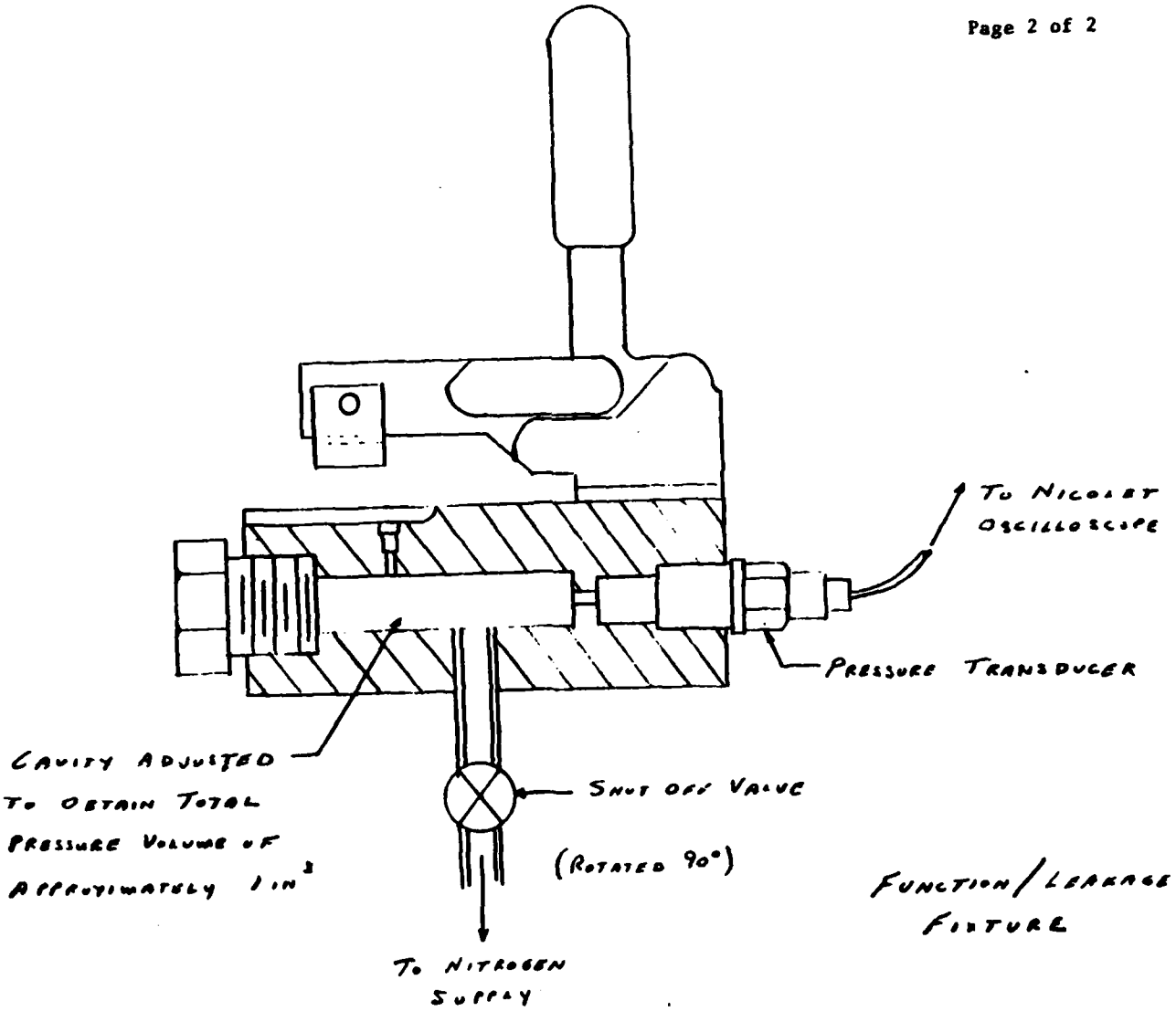
3.0 Fixture Design

The fixture design is shown on the attached drawing.

4.0 Pass/Fail Criteria.

There is no pass/fail criteria.

Submitted by: J. E. Funk
Principal Engineer




Function/Leakage Fixture

ATTACHMENT II

# TEST PLAN

## GEMMS/ERTS LANGLIE TEST

1.0 Purpose

The purpose of the test is to determine the pressure level/pulse time characteristics to produce trip line deployment.

2.0 Test Procedure

2.1 Test A

2.1.1 Adjust pressure input solenoid to produce a square wave pulse of 50±5ms duration. Check that pressure rise and fall rates are 50 psi/ms minimum.

2.1.2 Adjust pressure input level desired. (Estimate expected release level from results of leakage test for first trial).

2.1.3 Install sensor in release fixture, pressurize and record result.

2.1.4 Repeat 2.1.2 and 2.1.3 (for a total of 30 units) using the Langlie test procedure per MIL-STD-331A and a new sensor for each trial.

2.2 Test B

2.2.1 Repeat 2.1 except the pulse duration will be adjusted to 75±5ms duration.

2.3 Test C

2.3.1 Repeat 2.1 except the pulse duration will be adjusted to 100±5 ms duration.

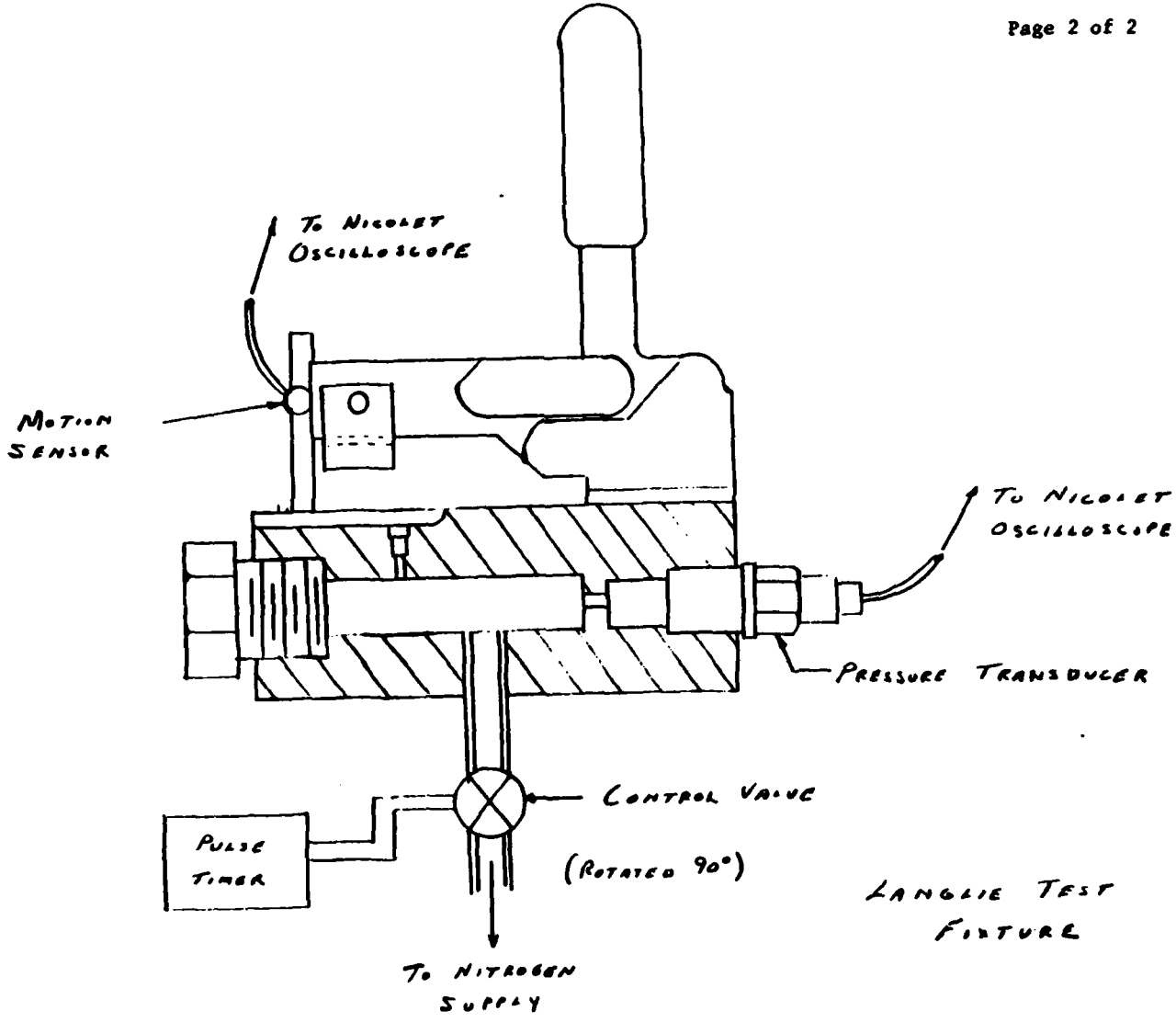
3.0 Fixture Design

The fixture design is shown on the attached drawing.

4.0 Pass/Fail Criteria

There is no pass/fail criteria.

Submitted by: J. E. Funk
Principal Engineer




Langlie Test Fixture

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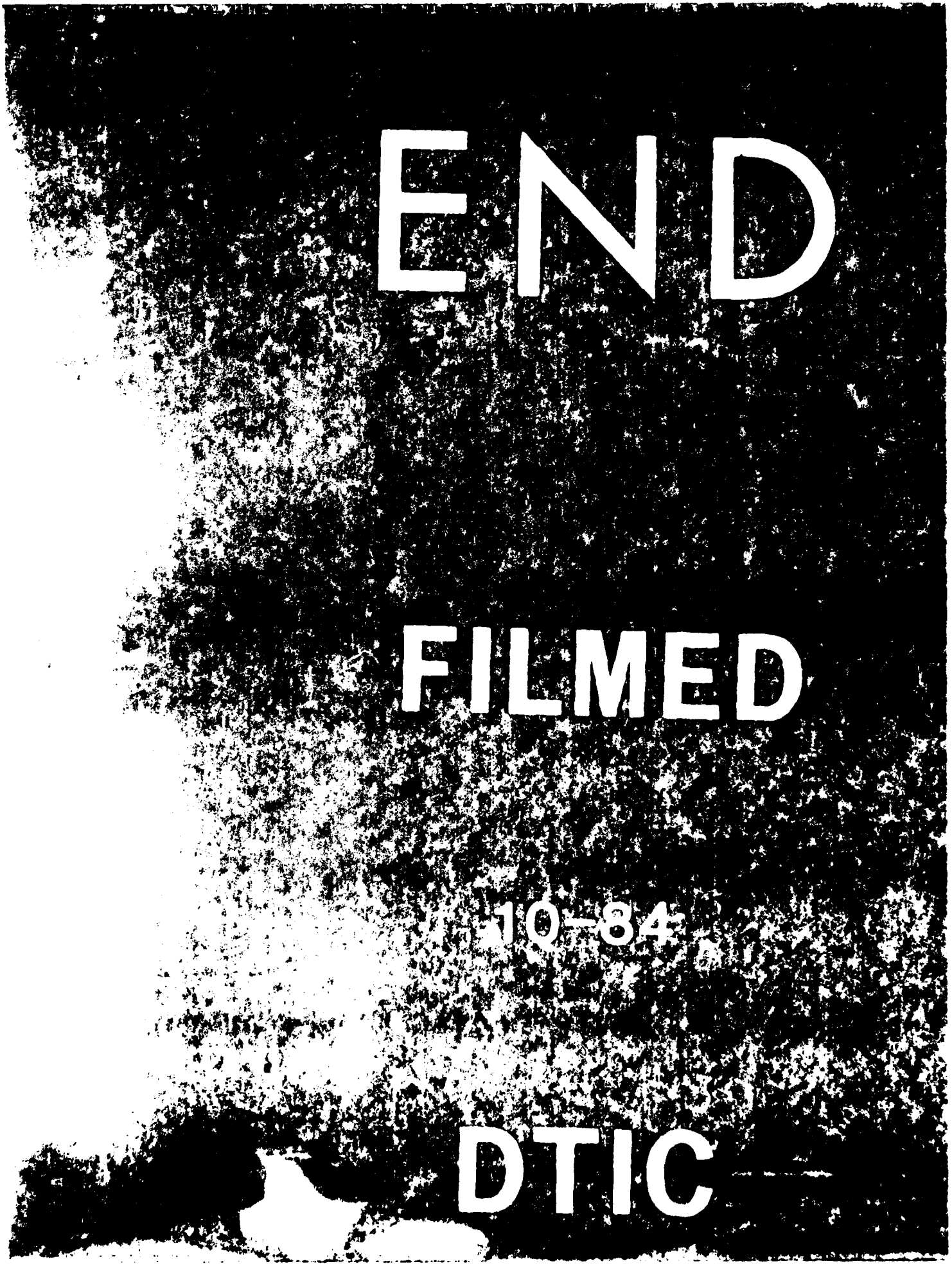
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